4. FIELD ACTIVITIES

The following sections describe the field activities and procedures to be used to meet the DQOs described in Section 3.1. Prior to commencing any sampling activities, a prejob briefing will be held with all work-site personnel to review the requirements of the FSP, HASP, and other work control documentation, and to verify that all supporting documentation has been completed. Additionally, at the termination of the drilling and instrument installation activities, a postjob review will be conducted. Both prejob and postjob briefings will be conducted in accordance with applicable company policies and procedures. The field team leader (FTL) (and other project personnel) will need to ensure that the fieldwork is being performed using the most current and applicable company policies and procedures.

The OU 3-13, Group 4 perched water well installation program will include the lithologic and geophysical logging of boreholes, and the collection of alluvial, shallow, and deep sedimentary interbed materials for both Phases I and II. In addition, tensiometer, lysimeters, moisture sensors, piezometers, and aquifer monitoring wells will be installed to monitor vadose zone soil moisture, water chemistry, and perched zone and aquifer heads. The sampling requirements addressed in this FSP include a collection of borehole data, sampling of interbed sediments, groundwater sampling from the Phase I instruments, (including the tracer test sampling), and the initial round of Phase II sampling. The long-term collection of tensiometer and moisture sensor readings, and sampling of pore water and groundwater is not part of this FSP, but is covered under the Long Term Monitoring Plan for Group 4 (DOE-ID 2002a).

4.1 Well Locations

This well installation program will be accomplished in two phases. The justification for each phase is provided below.

4.1.1 Phase I Wells

The Phase I wells will allow better determination of the perched water recharge sources and will support the tracer tests. The goal of each tracer test (and the well location selection) is to provide information about the hydraulic connection between the recharge sources and the upper and lower perched water zones.

The wells will be in sets of 2 to 4 wells each. This strategy allows sampling of perched water in the same location at the multiple depths of concern: alluvium/basalt interface 9.0 to 13.7 m (30 to 45 ft), upper perched water (36.6 to 42.7 m [120 to 140 ft]), and lower perched water (115.8 to 128 m [380 to 420 ft]). The deepest well in each set will be drilled first. After the deep well is drilled, it will be geophysically logged. The borehole geophysical logs provide information on stratigraphy and locations of perched water; they will also be used to determine completions for each well in the set. The boreholes will be completed with instrumentation including tensiometers, suction lysimeters, and a piezometer wherever possible. This approach provides the best monitoring possible for the tracer test.

The criteria for placement of the wells are based on professional knowledge of the INTEC facility gained through past investigations, a thorough review of the stratigraphy of surrounding wells, past water sampling event results, and water level elevation monitoring. The criteria for selection of the Phase I and II well locations are similar, because the Phase I wells will be placed not only to monitor the tracer test but also to monitor the drain-out of the perched water (Phase I wells will become part of the Phase II monitoring network). The criteria for selection of Phase I well locations include:

- Near known significant recharge sources

- Near areas that will help examine the boundaries and connection of perched water zones

- Near areas where perched water in the alluvium may develop.

4.1.1.1 Big Lost River Well Set. This well set will be located south of the BLR (see Figure 4-1). The alluvial well will provide a location for sampling any perched water that may develop in the alluvium as a result of flow in the BLR. The upper and lower perched water wells will provide locations for sampling the perched water zones in the northern INTEC area. The set will be placed in a location near the BLR where monitoring wells currently do not exist. These wells will serve as the monitoring points for the BLR tracer (and indicator parameters, should they be present). Wells at this location will help define the northern boundary and vertical extent of the perched water zones and will help identify the hydraulic connection between the river and the perched water zones.

4.1.1.2 Sewage Treatment Lagoon Well Set. This well set will be located southwest of the sewage treatment lagoons (see Figure 4-1). It will provide sampling locations in the northeastern portion of INTEC within the alluvium (where perched water may have developed in the alluvium as a result of flow in the BLR or discharge from the sewage treatment lagoons) and in the upper and lower perched water. The set will be placed in a location near the sewage treatment lagoons where no monitoring wells in the perched water currently exist. This well set will serve as the alluvium/basalt interface, upper perched water and lower perched water-monitoring points for the tracers. The wells at this location will help define the vertical depth and the northeastern boundary of the perched water zones. They will also provide information on the hydraulic connection between the river, the sewage treatment lagoons, and the perched water zones.

4.1.1.3 Percolation Pond Well Set. This well set will provide a location for sampling perched water that has developed in the alluvium and in the upper and lower perched water as a result of wastewater disposal in the percolation ponds (see Figure 4-1). The wells will be placed north of the percolation ponds at a location where no monitoring wells in the alluvium currently exist. (Upper perched water wells exist to the north and south, and one lower perched water well exists to the north.) This well set will provide monitoring points for the tracer introduced into the percolation ponds (and indicator parameters, if they are present). These wells will help identify the locations and vertical depth of the perched water and provide information on the hydraulic connection between the percolation ponds and the perched water zones.

4.1.1.4 Tank Farm Well Set. This well set will be located on the northwest corner of the tank farm (see Figure 4-1) and will include four wells: alluvium, upper perched water, lower perched water, and aquifer skimmer. The location for this well set was selected to provide a monitoring point between the BLR and the tank farm and to access contaminated water that might move to the northwest from the tank farm. These wells will help define effects of the BLR flow on the perched water at the alluvium/basalt interface, in both perched water zones and in the SRPA.

4.1.1.5 Central Well Set. This well set will be in a central location between the north and south perched water bodies (see Figure 4-1). The set will provide monitoring points for the shallow perched water and deep perched water zones.

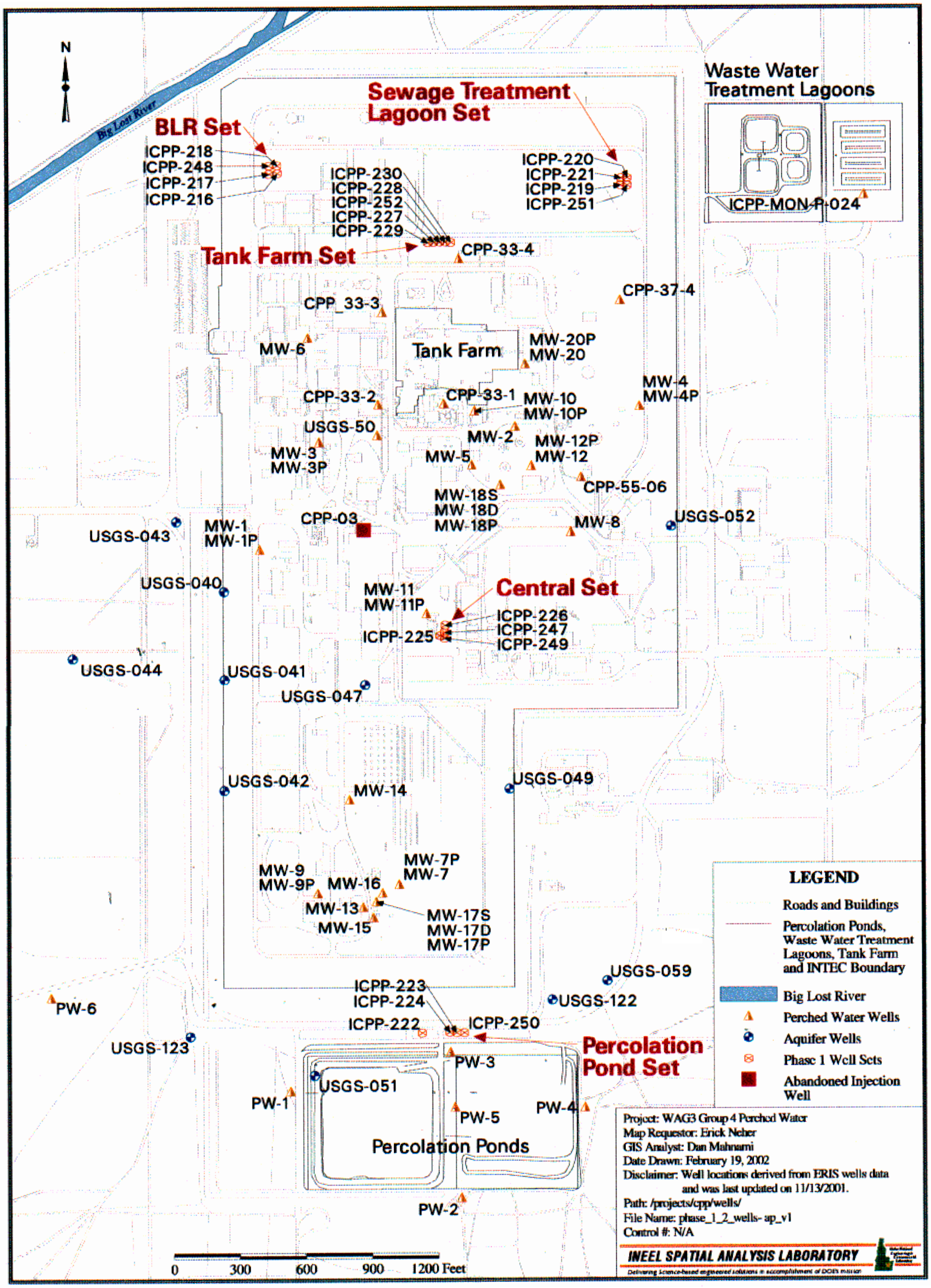

Figure 4-1. Map of INTEC showing existing and proposed well locations.

4.1.2 Phase II Wells

The Phase II wells will provide moisture monitoring and COC sampling locations for monitoring the perched water drain-out and flux to the SRPA. All well sets will contain at least three wells, one to be completed in the upper perched water zone, another to be completed in the lower perched water zone, and a third to be completed in the SRPA. Wells at these depths will be instrumented with tensiometers for measuring soil matric potential and with piezometers and lysimeters for collecting water samples for COC analysis. The aquifer skimmer wells will be screened across the water table. Actual completion depth to the bottom of the screen will be slightly below the SRPA water table (~140 m [460 ft]). The skimmer wells will be used for sampling aquifer water to determine contaminant flux out of the vadose zone.

The criteria for selection of Phase II wells include the following:

- Placement near known significant recharge sources such as the percolation ponds, the BLR, and the sewage treatment lagoons (all the Phase I wells)
- Placement near known areas of significant surface contamination, for example, the tank farm
- Placement inside the known perched water zones, away from the edges
- Placement near areas where perched water in the alluvium may develop
- Placement near areas where existing wells indicate elevated contamination levels in the perched water, for example, MW-18, MW-20, MW-10, MW-5, and MW-2.

4.1.2.1 Well Set #1. Well set #1 will be located near the southwest corner of the INTEC tank farm and will include up to four wells: an alluvial well, the upper and lower perched water zones, and an aquifer skimmer well. The ideal location is between the tank farm and the old injection well, a past source of contaminated recharge. The alluvial well will be used to detect perching at the alluvial/basalt interface, should it occur. Currently, the closest monitoring points are CPP-33-2 and USGS-50. CPP-33-2 monitors only the shallow perched water. Although USGS-50 monitors the deep perched zone, the water from this well may have been compromised due to past use for service waste injection during injection well repair.

4.1.2.2 Well Set #2. Well set #2 will be located directly south of the tank farm and includes up to four wells targeting the alluvail, upper and lower perched water zones, and the SRPA. An alluvial well may not be drilled at this location due to the lack of moisture found at the alluvium/basalt interface in nearby wells. Should water be found during drilling at this location an alluvial well can be added. The location is down gradient from the tank farm, between the tank farm release sites of CPP-28 and MW-18. MW-18 has high contaminant levels in the upper perched, lower perched, and aquifer wells. Well Set #2 will help to determine the source of contamination. Its location is also near wells MW-10, MW-5 and MW-2, all with elevated Sr-90 levels when sampled in 1995. It is in a crucial location for gathering moisture data that might support efforts to prevent contaminant flux from reaching the SRPA.

4.2 Monitoring and Sampling Locations

The following discussion includes locations for the sampling of the perched water and monitoring water level measurements, matric potentials, and soil moisture content.

4.2.1 Perched Water Sampling Locations

A discussion of the new wells to be included is provided above (Section 4.1). These wells are listed in Table 4-1. All existing perched water wells will also be sampled as part of the Phase I and II monitoring networks. However, some of the wells may never be suitable for sampling or at best can be sampled only during "wet" times because they are either permanently or seasonally dry. The characteristics of many of the existing wells are not currently understood because they have not been monitored for extended periods of time. Table 4-2 is an updated listing of INTEC perched water wells and piezometers. Prior to any sampling under this plan, water level measurements will be taken to determine the suitability of each individual well.

Most of the existing perched water wells do not have dedicated pumps, the exceptions being PW-1, PW-4, PW-5, and USGS-50. These wells are equipped with 2-in. rediflow pumps. Dedicated pumps may be installed in perched water wells where there is sufficient water. In addition to well completion information, Table 4-2 lists the most current (FY-99) measured water levels and calculated purge volumes. The actual water levels in some of these wells have not been measured even though the wells are believed to have water in them. In the cases where the water level is unknown, no purge volume has been calculated. Four of the 47 wells and piezometers target the lower perched water; the rest are completed in the upper perched water zones.

Suction lysimeters to be installed under this FSP will be used to collect soil-pore water samples. In addition to the suction lysimeters installed under this FSP, a survey will be conducted to identify whether any of the suction lysimeters currently installed are in working order. If any are found to be accessible and in working order, they will be evaluated whether to be added to the existing monitoring network. Locations believed to contain suction lysimeters include wells 33-2, 33-3, 33-5L, and A-60 through A-66.

4.2.2 Perched Water Level Monitoring Locations

All existing perched water wells (that are not permanently dry) and all new wells drilled under this FSP will be included in the water level monitoring network during Phase II. If the BLR contingency is not required, the network may be reduced in number and/or frequency following the decision on the BLR contingency. If the BLR contingency is adopted, other wells may be added to the monitoring network.

4.2.3 Soil Moisture Monitoring Locations

Soil moisture and matric potential measurements will be taken in the monitoring well network (Phase I and II wells). None of the existing perched water wells are instrumented to permit moisture data collection. Figure 4-1 is a map showing the locations of the proposed Phase I and the Phase II wells to be installed under this FSP.

4.3 Well Installation

NOTE: *The discussions below for Phase I well installation were written in September 2000 (prior to Phase I well installations) and are retained in the original form. For details on the final methodology, well locations, well depths, well instrumentation, status of Phase I wells, and variations to the sampling and analysis process, refer to the Phase I Monitoring Well and Tracer Study Report (DOE-ID 2002a).*

Table 4-1. Phase I and proposed Phase II wells that will be installed to support the Group 4 sampling and monitoring.

Phase I Wells			
Phase I Wells	Depth (ft bgs)/ Target[a]	Instrumentation[a]	Data Types[a]
BLR A	45 Alluvium	2-in. piezometer, lysimeter, tensiometer	Perched water, soil-pore water, matric potential
BLR B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential, moisture content
BLR C	380 to 420 Lower perched zone	4-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential, moisture content
Sewage lagoon treatment A	45 Alluvium	2-in. piezometer, lysimeter, tensiometer	Perched water, soil-pore water, matric potential
Sewage lagoon treatment B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Soil-pore water, matric potential, moisture content
Sewage lagoon treatment C	380 to 420 Lower perched zone	4-in. piezometer, lysimeter, tensiometer	Perched water, soil-pore water, matric potential, moisture content
Percolation pond A	45 Alluvim	2-in. piezometer, lysimeter, tensiometer	Perched water, soil-pore water, matric potential
Percolation pond B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore, water, matric potential, moisture content
Percolation pond C	380 to 420 Lower perched zone	4-in. piezometer, lyimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential, moisture content
Central B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, water, matric potential, moisture content
Central C	380 to 420 Lower perched zone	4-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential, moisture content
Tank farm A	45 Alluvim	2-in. piezometer, lysimeter, tensiometer	Perched water, soil-pore water, matric potential
Tank farm B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore, water, matric potential, moisture content
Tank farm C	380 to 420 Lower perched zone	4-in. piezometer, lyimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential, moisture content
Tank farm D	450 to 500 Aquifer	6-in. well	SRPA water

Table 4-1. (continued).

Proposed Phase II Wells			
Phase II Wells	Depth (ft bgs)/ Target	Instrumentation	Data Types[a]
1-B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, Soil-pore water, matric potential
1-C	380 to 420 Lower perched zone	4-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, Soil-pore water, matric potential
1-D	450 to 500 Aquifer	6-in. well	SRPA water
2-B	120 to 140 Upper perched zone	2-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential
2-C	380 to 420 Lower perched zone	4-in. piezometer, lysimeter, tensiometer, moisture sensor	Perched water, soil-pore water, matric potential
2-D	450 to 500 Aquifer	6-in. well	SRPA water

a. The well completion depth and depths that instrumentation will be installed in the Phase I and II wells will be determined following geophysical borehole logging of the deepest hole in a particular set. The intent is to complete and instrument the hole in the primary perched water zone and set additional instrumentation in other perched zones should they be identified by the geophysical logging.

Phase I drilling will consist of the installation of 15 wells. These wells will be drilled in sets of two to four as discussed in Section 4.1.1. Phase II drilling will consist of the installation of an additional six wells. Placement of these wells will be primarily around the tank farm; however, final placement of the Phase II wells be based, in part, on the results of the Phase I activities. Table 4-1 and Figure 4-1 summarize the location, completion details, and data to be collected during each phase of drilling.

The locations shown on Figure 4-1 are the approximate location for the center of the well sets. The wells at each set will be located approximately 25 feet (7.6 m) apart to reduce the possibility of borehole intersections at depth and interference of borehole seal materials between boreholes. Sites will be cleared for utilities and obstructions prior to drilling. Following final site selection, the site will be surveyed to establish the final drilling location. Because final completion depth will be determined in the field, depths listed in Table 4-1 are only estimated values.

Borehole lithology, geophysical, and radiological screening logs will be generated from the deepest well at each set. Other boreholes within a set may also be logged at the discretion of the field team leader/field geologist. Well logging (hole deviation, caliper, natural gamma, density, neutron, gamma-gamma, video, high-resolution gamma spectroscopy, alpha/beta spectroscopy) will be completed over the entire depth of the borehole and will be used to guide the drilling, sampling, and completion depths of the other vadose zone wells at that set. The exact sampling locations for interbed sediment samples will be dependent upon the lithology encountered in each borehole and will be decided in the field.

4.3.1 Drilling Methods

Each well set will be drilled with a combination of wire-line coring and dual-wall, reverse-circulation, air-rotary drilling. The deepest borehole in each well set will be drilled first, with continuous core collection from ground surface to total depth. As perched water zones are encountered, casing will be installed and sealed in place. This is required to prevent contaminant movement to lower, possibly cleaner, perched zones as the borehole is being advanced. The borehole will be then advanced with a smaller bit. The surface casing will be of sufficient diameter to allow for 3 casing reductions before reaching total depth.

Table 4-2. Status of INTEC perched water wells at the conclusion of FY 2002 monitoring events.

Well Name	Well Alias	Water Level from Measuring Point (ft)	Water Level from Land Surface (ft)	Month/Year Measured	Casing Diam. (in.)	Well Depth from Land Surface (ft)	Well Screen Material	Well Screen from Land Surface (ft)	Final Well Status (2002)
ICPP-SCI-P-216	BLR-AL	dry	dry	08/2002	1.25	37	PVC	35.4-35.9	dry
ICPP-SCI-P-217	BLR-SP	dry	dry	08/2002	1	180.5	PVC	145-145.5	dry
ICPP-SCI-P-218	BLR-DP	382.50	380.16	08/2002	4	395	Stainless Steel	375-385	wet
ICPP-SCI-P-248	BLR-CH	131.37	128.83	08/2002	2	414.7	Stainless Steel	120-130	wet
ICPP-SCI-P-219	STL-AL	dry	dry	08/2002	1.25	31.5	PVC	30.4-30.9	dry
ICPP-SCI-P-221	STL-DP	437.38	434.71	08/2002	4	440	Stainless Steel	429-439	wet
ICPP-SCI-P-251	STL-CH	dry	dry	08/2002	1	451	PVC	99-109	dry
ICPP-SCI-P-251	STL-CH	dry	dry	08/2002	2	451	Stainless Steel	140-145	dry
ICPP-SCI-P-222	PP-AL	33.49		04/2002	1.25	33	PVC	30.8-31.3	dry
ICPP-SCI-P-223	PP-SP	dry	dry	08/2002	1	193	PVC	180-182	dry
ICPP-SCI-P-224	PP-DP	56.42	54.76	07/2002	1	398	PVC	50-55	wet
ICPP-SCI-P-224	PP-DP	376.10	374.44	06/2002	4	398	Stainless Steel	372-382	wet
ICPP-SCI-P-250	PP-CH	dry	dry	08/2002	1	414.8	PVC	187-192	dry
ICPP-SCI-P-250	PP-CH	238.21	235.74	08/2002	2	414.8	Stainless Steel	235-255	wet
ICPP-SCI-P-247	CS-AL	dry	dry	08/2002	1.25	58	PVC	46-46.5	dry
ICPP-SCI-P-225	CS-SP	dry	dry	08/2002	1	167	PVC	159-164	dry
ICPP-SCI-P-226	CS-DP	296.92	294.66	07/2002	1.25	405	PVC	288.5-293	wet
ICPP-SCI-P-226	CS-DP	dry	dry	08/2002	4	405	Stainless Steel	368-378	dry
ICPP-SCI-P-249	CS-CH	188.98	186.46	08/2001	2	402	Stainless Steel	188.5-198.5	wet (obstructed)
ICPP-SCI-P-227	TF-AL	dry	dry	08/2002	1.25	42.5	PVC	37.5-38	dry
ICPP-SCI-P-228	TF-SP	156.97		07/2002	1	202	PVC	145-150	dry
ICPP-SCI-P-229	TF-DP	dry	dry	08/2002	4	398	Stainless Steel	375-385	dry

Table 4-2. (continued).

Well Name	Well Alias	Water Level from Measuring Point (ft)	Water Level from Land Surface (ft)	Month/Year Measured	Casing Diam. (in.)	Well Depth from Land Surface (ft)	Well Screen Material	Well Screen from Land Surface (ft)	Final Well Status (2002)
ICPP-MON-A-230	TF-Aquifer	461.30		08/2001	6	523	Stainless Steel	443-483	wet
ICPP-SCI-P-252	TF-CH	152.65		04/2002	2	325	Stainless Steel	145-150	dry
CPP-33-1	33-1	100.80	98.6	6/2001	2	113.6	Stainless Steel	89 to 99	wet
CPP-33-2	33-2	104.02	102.82	08/2002	2	114.8	Stainless Steel	85.8 to 105.8	wet
CPP-33-3	33-3	118.15	115.65	08/2002	2	126.4	Stainless Steel	111.8 to 121.8	wet
CPP-33-4	33-4	104.81	102.71	05/2001	2	124	Stainless Steel	98.2 to 118.5	wet (obstructed)
CPP-37-4	37-4	106.00	104.3	08/2002	2	113.4	Stainless Steel	99.9 to 109.9	wet
CPP-55-06	55-06	109.73	108.13	11/2001	2	114.6	Stainless Steel	93.1 to 113.1	wet
INTEC-MON-P-001	MW-1	329.055	326.255	08/2002	4	336.3	PVC	326 to 336	wet
INTEC-MON-P-001	MW-1	Unknown[a]			1	368.3	PVC	359 to 369	wet
INTEC-MON-P-002	MW-2	113.76	110.76	09/2001	2	112.3	PVC	102 to 112	muddy
INTEC-MON-P-003	MW-3	140.31	137.81	05/2001	2	138.3	PVC	128 to 138	dry
INTEC-MON-P-003	MW-3	121.90	119.4	07/2002	1	119	PVC	116.3 to 118	dry
INTEC-MON-P-004	MW-4	110.40	107.6	04/2002	2	110.8	PVC	100.6 to 110.6	dry
INTEC-MON-P-004	MW-4	131.30	128.9	04/2002	1	130.7	PVC	128 to 129.7	dry
INTEC-MON-P-005	MW-5	120.72	117.82	11/2001	2	126.7	Stainless Steel	106.5 to 126.5	wet
INTEC-MON-P-005	MW-6	83.7		121998	1	83.7	PVC	81.0 to 82.7	unknown
INTEC-MON-P-006	MW-6	121.97	119.17	08/2002	2	137	PVC	117 to 137	wet
INTEC MON-P-007	MW-7	107		12/1998	1	105	PVC	102.3 to 104	dry
INTEC-MON-P-007	MW-7	141.49	138.79	08/2002	2	142.3	PVC	132 to 142	wet
INTEC-MON-P-008	MW-8	126.60	123.9	07/2001	2	127	PVC	115 to 125	dry
INTEC-MON-P-009	MW-9	130.97	128.27	08/2002	2	132	PVC	120 to 130	wet
INTEC-MON-P-009	MW-9	108.71	106.01	06/2001	1	108	PVC	104.2 to 105.7	dry
INTEC-MON-P-010	MW-10	78		12/1998	1	78.2	PVC	76.5 to 78	dry
INTEC-MON-P-010	MW-10	148.39	145.69	09/2001	2	152	PVC	141 to 151	dry
INTEC-MON-P-011	MW-11	116		12/1998	1	116	PVC	112 to 113.5	dry

Table 4-2. (continued).

Well Name	Well Alias	Water Level from Measuring Point (ft)	Water Level from Land Surface (ft)	Month/Year Measured	Casing Diam. (in.)	Well Depth from Land Surface (ft)	Well Screen Material	Well Screen from Land Surface (ft)	Final Well Status (2002)
INTEC-MON-P-011	MW-11	131.78	130.98	08/2001	2	138	PVC	131 to 136	dry
INTEC-MON-P-012	MW-12	121.71	118.71	05/2001	2	119.0	PVC	109 to 119	dry
INTEC-MON-P-012	MW-12	153.77	150.77	05/2001	1	151.75	PVC	148.55 to 150.25	dry
INTEC-MON-P-013	MW-13	104		12/1998	2	105.4	PVC	100 to 105	dry
INTEC-MON-P-014	MW-14	104		12/1998	2	104	PVC	94 to 104	dry
INTEC-MON-P-015	MW-15	112.12	109.72	07/2002	2	131.6	PVC	111.3 to 131.3	wet
INTEC-MON-P-016	MW-16	112.2		12/1998	2	112.2	PVC	97 to 107	dry
INTEC-MON-P-017	MW-17	187.98	185.18	08/2002	2	193.3	PVC	181.7 to 191.7	wet
INTEC-MON-P-017	MW-17	273.8		12/1998	1.25	274	PVC	263.8 to 273.8	dry
INTEC-MON-P-017	MW-17	364.40	361.6	08/2002	OH[b]	381	Open Hole	360 to 381	wet
INTEC-MON-P-018	MW-18	124		12/3/98	2	124.2	PVC	113.5 to 123.5	dry
INTEC-MON-P-018	MW-18	409.76	406.43	11/2001	1.25	412	PVC	394 to 414	wet
INTEC-MON-P-020	MW-20	109.53	107.53	05/2001	1	106.7	PVC	96 to 106	dry (obstructed)
INTEC-MON-P-020	MW-20	139.80	137.8	08/2002	2	151.5	PVC	133.2 to 148.4	wet
INTEC-MON-P-024	MW-24	62.51	60.31	08/2002	4	123	Stainless Steel	53.5 to 73.5	wet
PW-1	PW-1	115.20	113.87	05/2002	6	120	Steel	100 to 120	dry
PW-2	PW-2	122.82	122.82	07/2002	6	131	Steel	111 to 131	wet
PW-3	PW-3	116.06	114.62	07/2002	6	125	Steel	103 to 123	wet
PW-4	PW-4	68.64	65.14	07/2002	6	150	Steel	110 to 150	wet
PW-5	PW-5	73.34	71.34	11/2001	6	131	Steel	109 to 129	wet
PW-6	PW-6	123.84		1/14/99	6	130	Steel	105 to 125	dry
USGS-050	USGS-050	383.33	383.33	11/2001	OH[b]	405	Open Hole	357 to 405	wet
USGS-081	USGS-081	93.19		12/21/98	OH[b]	104.3	Open hole	26 to 104.3	dry

Each additional borehole at a well set will be drilled using this reverse-air-rotary method. This allows for rapid drilling to the target depth established from the logging of the deep borehole. Unless determined in the field by the FTL or field geologist, no cores will be collected from subsequent holes.

The corehole will be advanced with a standard coring until the top of the targeted sedimentary interbed is encountered. Extreme caution will be used so that as little as possible of the interbed is breached upon first contact. At this point the face discharge bit will be changed over to a spring-loaded advance push-bit system with a lexan liner. Rock cores above and below interbeds will be collected in standard split-barrel sampling tubes. As the core barrel is recovered it will be surveyed by the radiological control technician (RCT). After the RCT verifies no external contamination, the core barrel will be opened and the lexan liner and the core surveyed by the RCT. If the RCT detects contamination on either the core barrel or core then appropriate actions will be taken as directed by the RCT. Field logging by the field geologist will follow RCT survey of the core. After logging of the core material, the lexan liner will be capped with plastic end caps. The liner may also be cut to shorter lengths as needed for various analyses. After the core has been logged it will be placed into standard corrugated core storage boxes.

After push-coring through the interbed, the advance bit will be removed and standard coring will resume to the next interbed. This process of alternating standard and advance-bit coring will continue until total depth of the hole is reached. After reaching the target total depth, each corehole deep boring will receive a complete suite of physical and geophysical downhole geologic logs.

Care will be taken to assure no drilling or sampling equipment other than the sample split barrel or lexan liner will come in contact with the sample material prior to, during, or after sample collection. All procedures and drilling and sampling equipment will be designed to minimize the release of any contamination to the environment. All activities will be conducted in accordance with current INEEL guidance and procedures related to well construction and maintenance.

4.3.2 Materials

Upon completion of all downhole activities the open boreholes will be equipped with instrumentation to provide for long term monitoring of vadose zone moisture and the collection of pore water samples. Results of the borehole logging will be used to determine the exact placement of the instrumentation. Each borehole will be equipped with a combination of tensiometers, suction lysimeters, and moisture sensors. Exact type and number of these instruments will depend on conditions encountered. In addition, all upper and lower perched water wells may have peizometers (2-in. for upper; 4-in. for lower) installed. The aquifer wells will be completed as 13-cm (6-in.) wells.

High pressure-vacuum lysimeters will be used for this project. Where perched water is present, lysimeters will be installed for sampling at a later date. These lysimeters consist of a two-section cup assembly. The lower chamber is a standard porous cup where soil moisture enters the unit. The upper portion is a sampling chamber separated by a check valve from the lower portion. Sample is collected by pulling a vacuum greater than the surrounding matric potential on the upper and lower chambers. Pore water then migrates into the porous stainless steel cup and passes through the check valve into the upper chamber. To retrieve a sample, pressure is applied to the upper chamber, using an inert gas, closing the check valve to the lower chamber and forcing the sample up the sample discharge line to the surface.

For shallow perched zones 2-in. piezometers will be used where possible. For deep perched zones the casing size increases to 4-in. Dedicated submersible pumps may be installed in perched water wells, if appropriate, also with a stainless steel discharge line. Motor size for those pumps will be determined based on the depth to water. Figure 4-2 shows a typical aquifer well installation. The SRPA wells will be constructed with minimum 6-in. 304 stainless steel 40-slot screen and Schedule 10 casing. A dedicated 3-5 horsepower submersible pump will be installed with a stainless steel discharge line.

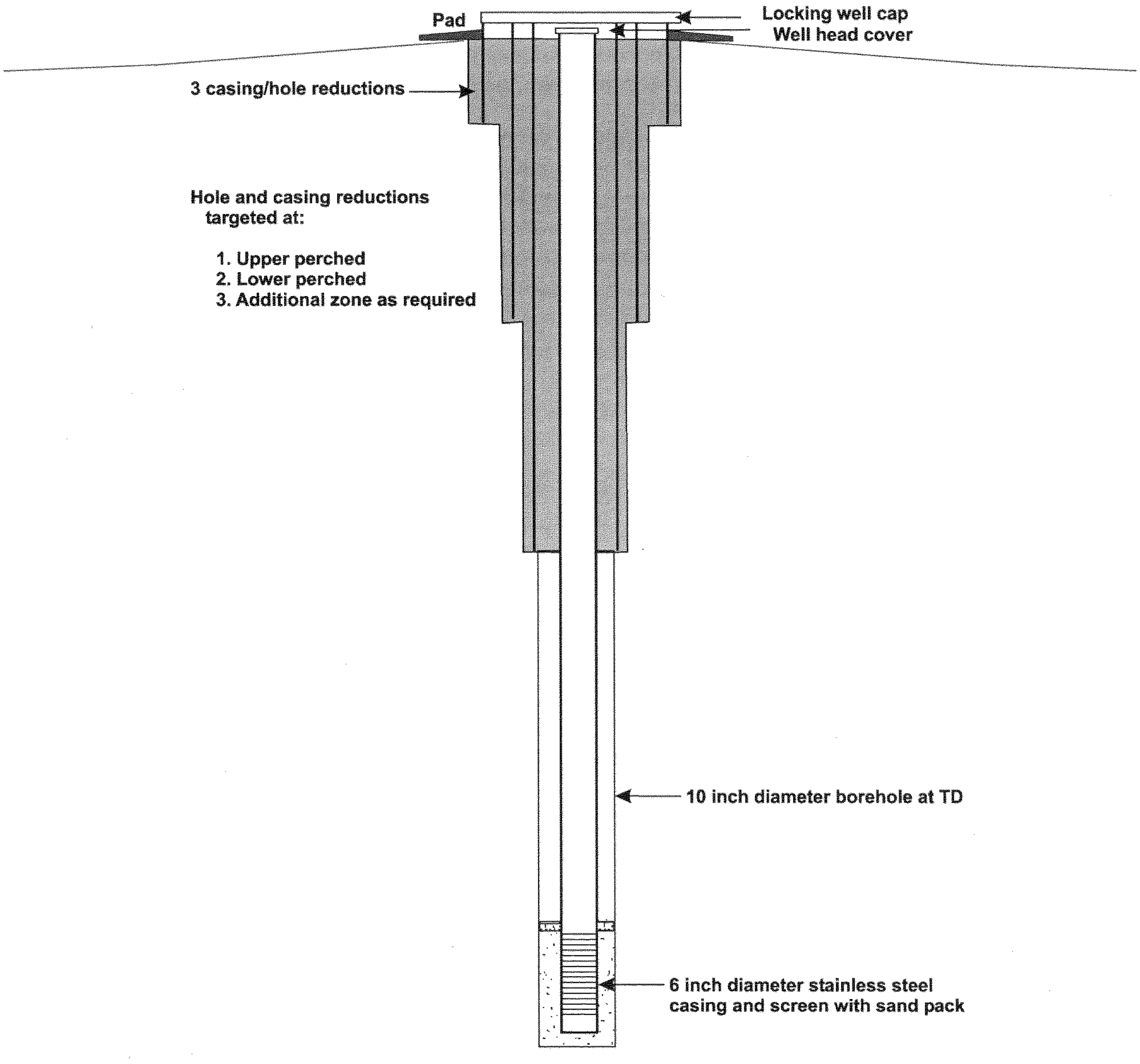

Figure 4-2. Conceptual diagram for aquifer well completion.

Existing perched zone wells will receive instrumentation appropriate with their intended use. At a minimum, this will include pressure transducers in all existing perched wells that currently have water in them. Pressure transducers measure the water pressure above the instrument. By knowing the depth at which the transducer is set this pressure can be converted to a water depth below ground surface with a simple calculation. The pressure rating required will be determined in the field based on the maximum water column in a piezometer or well. Other equipment that may be installed includes dedicated pumps.

4.3.3 Borehole Instrument Installation

Upon completion of all downhole activities the open boreholes will be equipped with instrumentation to provide for long-term monitoring of vadose zone moisture and for the collection of pore water samples. Each borehole will be equipped with a combination of tensiometers, suction lysimeters, and moisture sensors. Exact type and number of these instruments will depend on conditions encountered. Other moisture sensor instruments (i.e., moisture blocks) may be installed based on field conditions and as space allows. A 5-cm (2-in.) piezometer will be installed in the upper perched water and a 10-cm (4-in) piezometer in the lower perched water.

All tensiometers and lysimeters will be cleaned, assembled, and tested as directed by the manufacturer's instructions and by TRP-6572. In general, porous cups will be cleaned by allowing one (1) liter (33 oz.) of 8N hydrochloric acid to permeate each cup. This is followed by a distilled water rinse of 15 to 20 liters (4 to 5 gal). The distilled water rinse can be accelerated by applying a 20 psi to 30 psi pressure to drive the water through the cups' porous material. Following cleaning, the units will be assembled and tested for leaks. Testing will consist of placing the porous cup and instrument joints in a tank of water (an aquarium works well) and slowly applying a positive pressure (normally 15 psi [1.02 atm]) per the manufacturer's recommendation. Cups should not bubble until at least 15 psi. After testing, the units will be wrapped in clean plastic and transported to the field.

If possible, moisture sensors will be installed with the tensiometers and lysimeters, but before placement of the silica flour. Lowering the instrument bundle to slightly below the appropriate depth places the moisture sensor. The instrument bundle is pulled up to force the sensor against the wall of the borehole. At this time the sensor is tested for proper functioning. If it is functioning properly, then silica flour is placed around the instrument bundle. If it is not functioning properly, then the bundle is removed to the surface and repaired or replaced.

Multiple tensiometers may be installed at various depths within each borehole. Exact depths will be determined in the field based on borehole logging results. Where possible, two (2) tensiometers will be placed per borehole, one at or below the interbed and one at the top of the interbed (see Figures 4-3, 4-4, and 4-5). Tensiometers will be placed in the open borehole, then surrounded by silica flour slurry. This slurry will be emplaced via a 1-in. tremie pipe set directly above the tensiometer. A granular bentonite plug will be placed between the tensiometers. Granular bentonite will also be used to seal the open borehole from the last tensiometer/lysimeter placement to the ground surface.

Suction lysimeters are installed in a manner similar to the tensiometer. They will be placed such that the porous stainless steel sample cup is located at approximately the top of the interbed. The porous stainless steel cup will then be surrounded by silica flour slurry. Exact depths will be determined in the field based on borehole logging results.

The aquifer wells and piezometers will be constructed in the same way, except that only casing sizes will vary. After reaching the target depth and upon completion of geophysical logging (in the deep borehole) the screen and casing will be lowered into the open borehole. For aquifer wells, it is anticipated that 7.6 m (25 ft) of screen with a 1.5-m (5-ft) sump will be used. The screened interval will extend 1.5 m (5 ft) above the static water table. The bottom of the screen will extend across the first fractured interval. The exact screen length will be determined in the field. After placing the screen/casing assembly the annular space around the screen will be filled with clean silica sand as a filter pack. Sand will extend to approximately five feet above the top of the screen. A 1.5-m (5-ft) granular bentonite plug will be placed on the filter pack and hydrated. After full hydration of the bentonite the remaining annulus will be filled with a nonshrink cement grout. Piezometers will be installed in a similar manner. The screen bottom will be placed as close as practical to the top of the interbed. Either a bentonite seal or nonshrink grout may be used to seal the annulus.

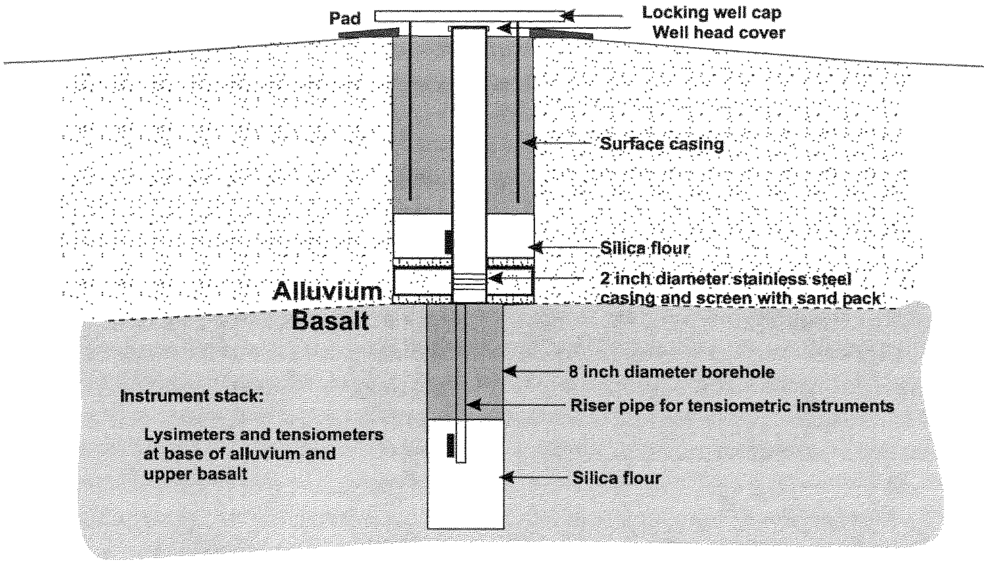

Figure 4-3. Conceptual diagram for alluvium zone instrument installation.

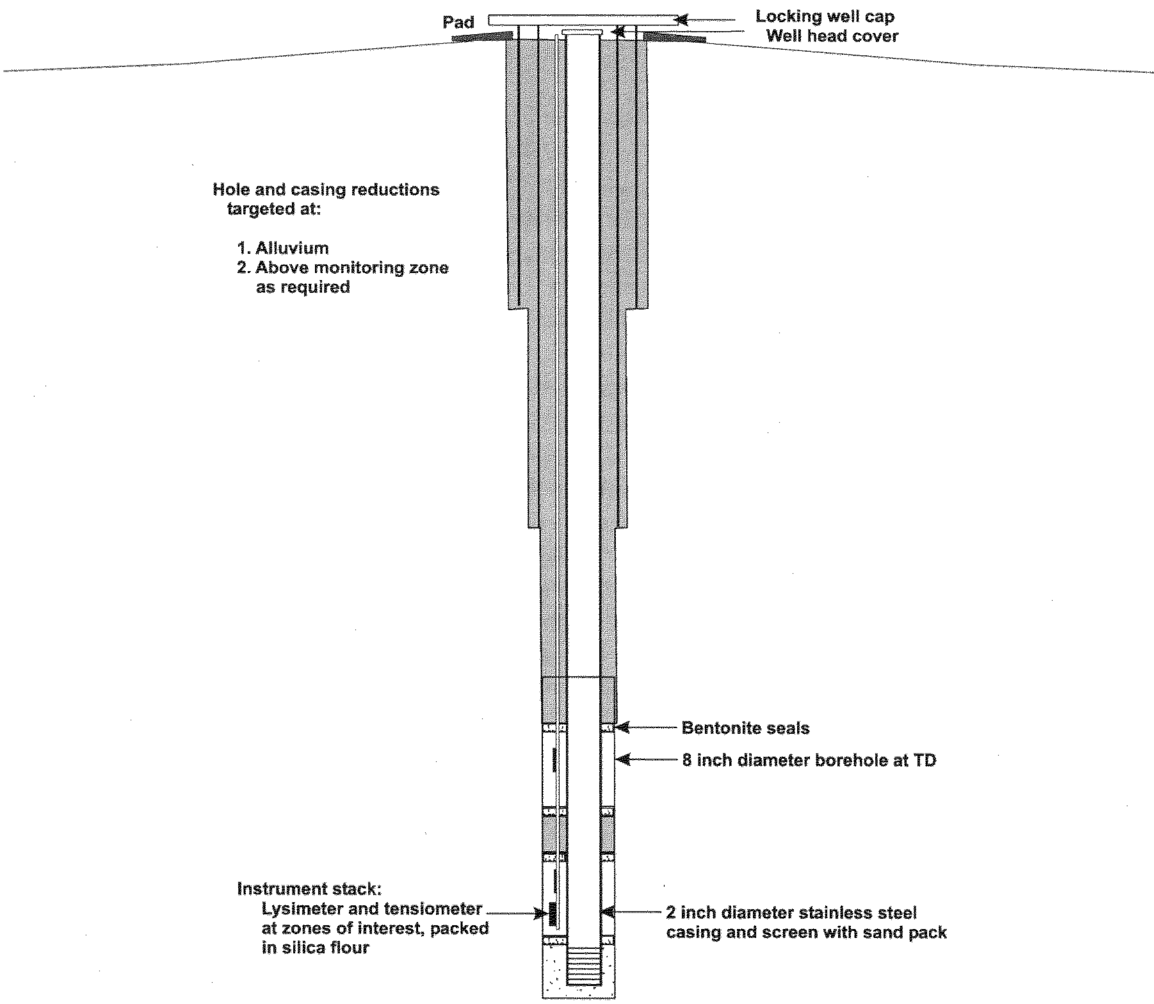

Figure 4-4. Conceptual diagram for shallow perched water zone instrument installation.

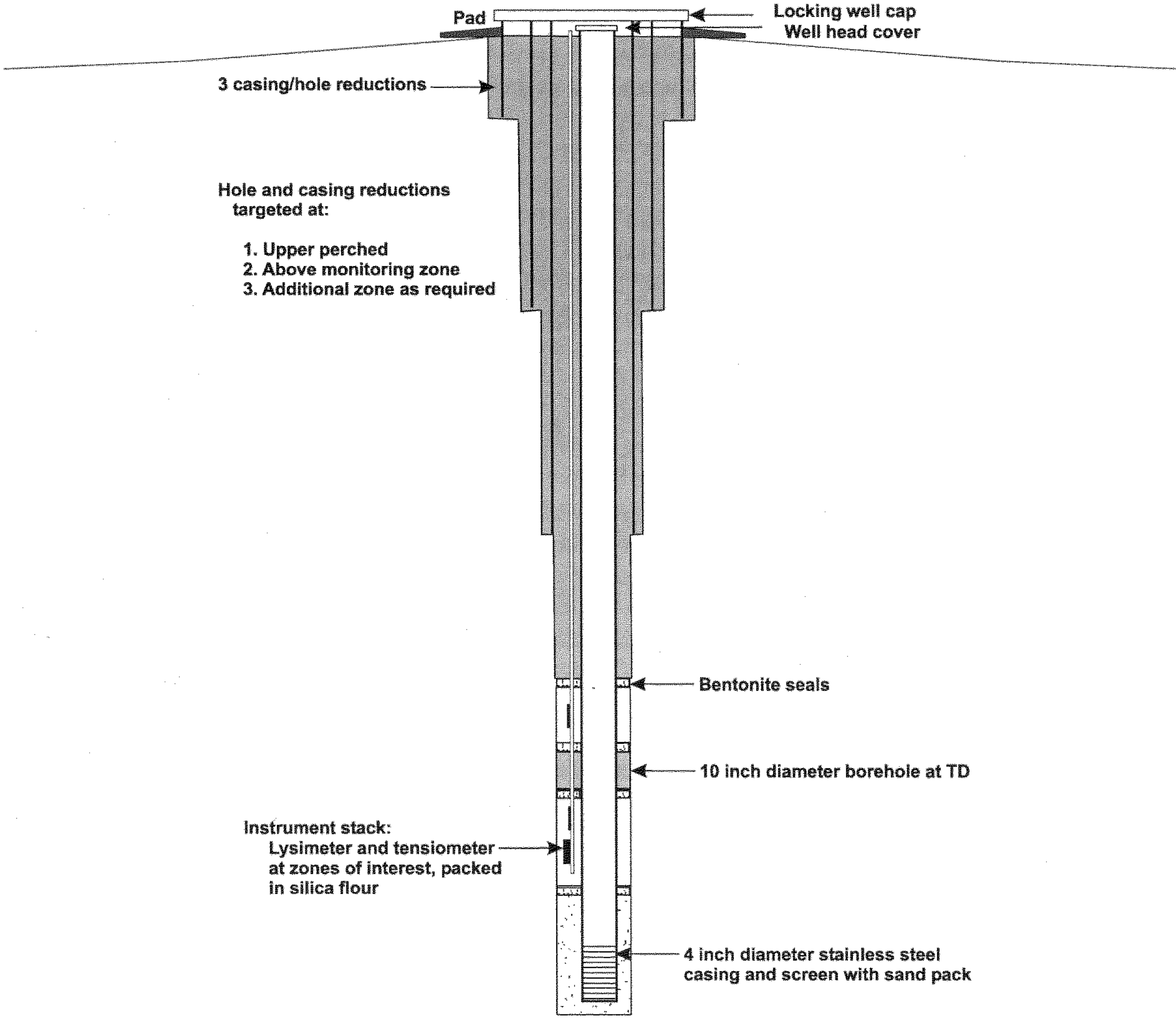

Figure 4-5. Conceptual diagram for deep perched water zone instrument installation.

Standard pressure transducers will be installed in all existing and new perched wells that have water in them. Transducers will be set after depth to water has been determined. Transducer cables will be measured and the transducer lowered into the piezometer to a depth that will allow for accurate head readings, but not to exceed the maximum pressure rating of the transducer. Care will be taken to assure that the transducer remains vertical and does not lie on the bottom of the well. Transducer accuracy will be verified using a water level probe.

All downhole instruments will be attached to a data logger at the surface. The data logger will allow for automated recording of various instrument values. Initially, tensiometer and moisture sensors will be read daily. Exact set up (24-hourly average or one time reading) will be determined in the field after proper instrument operation is verified.

4.3.4 Surface Completion

Each well head will be finished with a 0.9 × 0.9 × 0.5 m (3 × 3 × 1.5 ft) cement pad around the surface casing, sloped away from the well. A brass survey pin will be set in the wet cement in the northeast corner of the pad. The interior of the surface casing will contain a well seal with access/exit ports for each instrument installed in the borehole. A locking well cover will be installed.

4.3.5 Well Development

All aquifer wells installed under this FSP will be developed by pumping the well until the water discharge is clear and free from suspended sediments. According to past experience at the INEEL, this process usually takes only several minutes, is accomplished before a single well volume is evacuated, and can therefore be accomplished in conjunction with purging the monitoring well for the first sampling event. A record will be kept of field parameters during purging, and will also serve to document the development of the well. A full discussion of purging can be found in Section 4.5.2.

Perched water wells installed under this FSP that have standing water in them will also be developed, however, the methods used will vary. For wells that can supply an adequate yield of water, as determined during drilling process, the development will be conducted as described above. Wells deemed incapable of supplying water in amounts to support pumping, but still containing standing water, will be developed by bailing the well until three well volumes are removed or the well goes dry. Because the amounts of perched water flowing to wells can be quite low, recovery may be quite slow; therefore, if a well is bailed dry, development will stop and the well will be considered developed.

4.3.6 Drilling and Sampling Equipment Decontamination

All drilling equipment will be steam cleaned prior to entering the work area. Drilling equipment will be decontaminated between sets to ensure no cross-contamination among sites. Sampling equipment (inner barrels, quad latches, etc.) will be field cleaned between sampling runs. All downhole equipment (bits, drill pipe) used at a site will be decontaminated between boreholes. Instrumentation that is to be sent downhole (i.e., PVC pipe, stainless screen and casing) will also be steam cleaned prior to installation. Materials supplied in sealed bags from the manufacturer and certified as clean will not require additional steam cleaning. If, however, the packaging for this material has been significantly breached (i.e., the material is exposed) then it will require cleaning.

A central decontamination area will be established for this equipment decontamination. The decontamination area will consist of a portable, self-contained, decontamination pad. The portable decontamination pad will include equipment such as a steam cleaner, sump, and trash pump to the remove the decontamination fluids from the pad to a tank or container, as appropriate, with secondary containment. Typically, this pad and equipment are supplied and setup by the drilling subcontractor. The pad will be of sufficient size to so that the drill rig can be driven onto the pad and all decontamination fluids generated from steam cleaning are contained. Although not expected, in the event that high level radiological contamination of equipment is encountered (as defined in applicable company policies and procedures and at the discretion of the Radiological Control Technician at the drill site) the drilling equipment will be decontaminated at the decontamination facility located in CPP-659. If decontamination must occur in CPP-659, all wastes generated during the decontamination will be handled in accordance with the policies and procedures in place for the decontamination facility.

The decontamination methods for the drilling and sampling equipment will ensure maximum containment of decontamination fluids, minimization of waste, and minimize the chances of equipment contamination. Decontamination of the field equipment for this project will be performed as per applicable company policies and procedures. Additionally, evaluation of decontamination measures will be made during drilling in “clean” areas (i.e., south end of plant), and necessary modifications made to ensure containment, proper waste segregation, and waste minimization procedures will be in place prior to the start of drilling at potentially contaminated sites (such as around the tank farm).

4.3.7 Sampling Location Surveys

After drilling, sampling, and installing monitoring equipment, all borehole locations will be surveyed in accordance with applicable INEEL requirements.

4.4 Subsurface Sediment Collection

This section details the actions that will be used for the drilling and interbed sediment collection from the deepest well at each well set. This may be an aquifer well or a deep perched well. Also discussed is the use of surface geophysics for the sitting of the alluvial well sets.

4.4.1 Subsurface Sediment Sample Prioritization

Due to the difficulties inherent in the collection of samples from sedimentary interbeds, that at some targeted interbeds a sufficient volume of sample material may not be available to meet all of the analytical needs. If there is insufficient sample material collected during initial coring of the deep hole, it may be supplemented with material collected by coring the same interval at the next hole of the set. Should insufficient sample material be recovered, the available sample material will be allocated to meet the following analytical requirements in the order listed below:

1. Soil physical and hydraulic characterization samples
2. Soil chemistry samples
3. Treatability studies/archive samples.

4.4.2 Samples for Physical/Geotechnical Analysis

It is anticipated that three samples will be collected from each interbed for physical/hydraulic analysis. Samples will be collected from the top, middle, and bottom of the interbed. Samples must be undisturbed for most of the requested analyses. Therefore, samples will be collected by cutting the lexan liner and capping the ends. Efforts will be made to minimize sample compaction during cutting and transport.

Physical and hydraulic analyses will consist of a moisture characterization curve, grain size distribution, moisture content, effective porosity, bulk density, and saturated and unsaturated hydraulic conductivity.

4.4.3 Samples for Chemical Analysis

It is anticipated that samples for chemical analysis will be collected from the upper half of the interbed. All efforts will be made to collect chemical samples from saturated material when it exists. Per the above prioritization scheme, chemistry samples will be collected from immediately below the upper geotechnical sample. Samples may be collected by either cutting and capping the lexan liner, or transferring interbed material from the liner to appropriate jars. The final method will be determined through discussions with the analytical laboratory. Samples will be analyzed for COCs, Target Analyte List (TAL) metals, and major cations and anions, cation exchange capacity, extractable iron, and soil pH.

4.4.4 Downhole Geophysical Logging

Upon reaching the target depth each hole will receive a complete suite of physical and geophysical downhole geologic logs. At a minimum, this suite will consist of video, caliper, natural gamma, deviation, gamma-gamma, density, neutron, and high-resolution gamma spectroscopy. All geophysical logs will be used for comparison of information and to assist in the field determination of instrument placement. Upon completion of logging, the borehole instrumentation will be installed.

The INEEL field office of the USGS will perform the video, caliper, natural gamma, deviation, gamma-gamma, and neutron logs. BBWI personnel will perform high-resolution gamma spectroscopy logs. Geophysical logs involving a radioactive source (gamma-gamma, and neutron) will be conducted inside the core string prior to its removal from the corehole. All other logs will be done in the open borehole.

4.5 Groundwater Sampling

This section describes the sampling and monitoring procedures and equipment to be used for the Phase I, initial round of Phase II, and tracer test monitoring. Prior to the commencement of any sampling activities, a presampling meeting will be held to review the requirements of the FSP and Health and Safety Plan (HASP), applicable company policies and procedures, and to ensure all supporting documentation has been completed.

Tables 4-3 and 4-4 identify the wells and lysimeters *anticipated* to be sampled as part of the initial round of Phase II sampling. The tables identify wells/lysimeters that either (a) currently contained perched water, (b) have recently contained perched water, (c) have demonstrated the historic potential to accumulate water in the late winter/early spring (when sampling activities are planned to commence), or (d) were not sampled previously. Because of changing conditions in the perched water bodies an exact listing of wells and lysimeters that will contain sufficient water for sample collection cannot be predicted. As a result, some wells/lysimeters that currently contain water may be dry when field activities begin and/or, some wells/lysimeters that are currently dry could provide unexpected opportunities for perched water samples. It will be the responsibility of the FTL and project team to identify which wells and lysimeters will provide sufficient sample material in order to meet the objectives of this FSP.

4.5.1 Water Level Measurement

Prior to sampling any well or piezometer, depth to water will be measured using either an electronic sounding tape or steel tape and chalk as described in applicable company policies and procedures. Measurement of all water levels will be recorded to an accuracy of 0.01 ft.

4.5.2 Well Purging

All aquifer skimmer wells and perched water wells that have sufficient water will be purged prior to sample collection. Well purging is performed to remove stagnant water from the borehole in an attempt to draw in water more representative of the actual aquifer conditions prior to sampling. During the purging operation, a flow-through cell with a Hydrolab (or equivalent) water quality monitor will be used to measure specific conductance, pH, dissolved oxygen, and temperature. Well purging procedures are provided in applicable company policies and procedures. Wells will be purged to remove a minimum of three well casing volumes of water and when three consecutive water quality parameters are within the following limits:

Table 4-3. Perched wells anticipated to be sample for the initial round of sampling for Phase II.

Well ID	Sampled during Phase I?	Well ID	Sampled during Phase I?
CPP-33-1	No	MW-17-2 (INTEC-MON-P-017)	Yes
CPP-33-2	No	MW-17-4 (INTEC-MON-P-017)	No
CPP-33-3	No	MW-18-1 (INTEC-MON-P-018)	Rad Only
CPP-33-4-2	No	MW-20-2 (INTEC-MON-P-020)	Yes
CPP-37-4	Yes	MW-24 (INTEC-MON-P-024)	Yes
CPP-55-06	Yes	PW-1	Yes
MW-1-1 (INTEC-MON-P-001)	No	PW-2	Yes
MW-1-4 (INTEC-MON-P-001)	Yes	PW-3	Yes
MW-2 (INTEC-MON-P-002)	Yes	PW-4	Yes
MW-3-1 (INTEC-MON-P-003)	No	PW-5	Yes
MW-4-1 (INTEC-MON-P-004)	No	USGS-50	Yes
MW-4-2 (INTEC-MON-P-004)	No	BLR-DP (ICPP-SCI-P-218)	Yes
MW-5 (INTEC-MON-P-005)	Yes	BLR-CH-2 (ICPP-SCI-P-248)	No
MW-6-2 (INTEC-MON-P-006)	Yes	CS-DP-1 (ICPP-SCI-P-226)	No
MW-7-2 (INTEC-MON-P-007)	No	PP-CH (ICPP-SCI-P-250)	Yes
MW-9-2 (INTEC-MON-P-009)	No	PP-DP-1 (ICPP-SCI-P-224)	No
MW-10-2 (INTEC-MON-P-010)	Rad Only	PP-DP-4 (ICPP-SCI-P-224)	No
MW-15 (INTEC-MON-P-015)	No	STL-DP (ICPP-SCI-P-221)	No

Table 4-4. Lysimeters anticipated to be sample for the initial round of sampling for Phase II.

Location	Sampled during Phase I?
BLR-AL (ICPP-SCI-P-216)	Yes
CS-AL (ICPP-SCI-P-247)	Yes
PP-AL (ICPP-SCI-P-222)	Yes
PP-SP (ICPP-SCI-P-223)	Rad only
STL-AL (ICPP-SCI-P-219)	Yes
STL-SP (ICPP-SCI-P-220)	Rad only
TF-AL (ICPP-SCI-P-227)	Yes
CPP-33-2	No
CPP-33-3	No
Tank farm ‘A’ series	No

- Ph ± 0.1
- Temperature $\pm 0.5°C$
- Specific conductance ± 10 µmhos/cm.

Only after completion of well purging can a sample for water quality analysis can be collected. The perched water formation surrounding some of the wells may be inadequate to supply the full purge volume. In this case, the well will be purged to dryness and allowed to recover to 90% of the original water level or up to 24 hours. After recovery, samples will be collected as directed in applicable company policies and procedures.

4.5.3 Sample Collection

Before sample collection begins, all non-dedicated sampling equipment that is to come in contact with the water sample will be cleaned following the procedure outlined in INEEL applicable company policies and procedures. Upon the completion of sampling, all non-dedicated equipment that came in contact with the well water will be decontaminated prior to storage per applicable company policies and procedures, with the exception that the isopropanol steps for decontamination will be omitted.

Prior to purging, the water level in each well will be measured. The well will then be purged a minimum of three well-casing volumes until the pH, temperature, dissolved oxygen, and specific conductance of the purge water have stabilized, or until a maximum of five well-casing volumes have been removed. If the well goes dry prior to purging three casing volumes, purging will be considered complete and samples collected after 90% recovery in the well or after 24 hours. If parameters are still not stable after five volumes have been removed, samples will be collected and appropriate notations will be recorded in the logbook.

Perched water samples will be collected for the analyses defined in Tables 4-5 and 4-6. The requirements for containers, preservation methods, sample volumes, holding times, and analytical methods are provided in Table 4-7.

Sample bottles for perched water samples will be filled to approximately 90 to 95% of capacity to allow for content expansion or addition of preservation. The only exception to this is for VOC samples, for which no headspace is permitted. Samples to be analyzed for metals (TAL metals plus boron and strontium) will be collected as both unfiltered and filtered. Filtered samples will be passed through a 0.45 µm filter. Samples requiring acid preservation will be acidified to a pH < 2 using the appropriate type of acid.

4.5.4 Suction Lysimeter Sampling

Suction lysimeters are dedicated sampling equipment that are buried in the subsurface. For this reason they do not require cleaning prior to sampling. Because sample volumes may be limited, field chemistry data are not usually collected.

Sampling of lysimeters will follow the procedure delineated in applicable company policies and procedures. If sufficient sample volume can be collected, the sample water will be analyzed for the same chemical suite as the perched water. If only a limited amount of water can be collected, then samples will be prioritized based on project requirements and data needs.

Table 4-5. Perched water analytes for Phase I sampling of well network.

Cations	Anions	COCs	Hazardous Substances	Field	Conditional[a]
Calcium	Sulfate	Tritium	1,1,1-TCA	Temperature	Nitrogen isotope ratio
Magnesium	Chloride	Technicium-99	Carbon tetrachloride	pH	
Sodium	Bromide	Iodine-129	TCE	Alkalinity	Oxygen isotope ratio
Potassium	Fluoride	Strontium-90	PCE	Dissolved Oxygen	
Strontium Antimony Arsenic	Nitrate	Plutonium isotopes (Pu-238, -239, -240, and -241)	Benzene	Specific Conductivity	Strontium isotope ratio
Boron Beryllium Cadmium	Nitrite	Uranium isotopes (U-234, -235, and -238)	Toluene		Hydrogen isotope ratio
Chromium	Phosphate	Am-241	Carbon disulfide		
Lead		Np-237	Pyridine		
Silver		Ce-137			
Thallium		Mercury			

a. These analyses are conditional upon receipt of research funding for a separate study. Should the research grant be funded these analyses will be conducted.

Table 4-6. Perched water analytes for Phase II sampling of well network.

Cations	Anions	COCs	Hazardous Substances[a]	Field	Other/Conditional
Calcium	Sulfate	Tritium	1,1,1-TCA	Temperature	Nitrogen isotope ratio[a]
Magnesium	Chloride	Technicium-99	Carbon tetrachloride	pH	Alkalinity
Sodium	Bromide	Iodine-129	TCE		
Potassium	Fluoride	Strontium-90	PCE	Dissolved oxygen	
Strontium Antimony Arsenic	Nitrate/ Nitrite	Plutonium isotopes (Pu-238, -239, -240, and -241)	Benzene	Specific conductivity	
Boron Beryllium Cadmium		Uranium isotopes (U-234, -235, and -238)	Toluene		
Chromium		Am-241	Carbon disulfide		
Lead		Np-237	Pyridine		
Silver		Ce-137			
Thallium		Mercury			

a. Analyses for “Hazardous Substances” (i.e., VOCs) are only planned for new wells constructed during Phase II activities.

Table 4-7. Specific sample requirements for perched water samples.

Analytical Parameter	Volume and Container Type	Preservation	Holding Time
Metals (Ca, Mg, Na, K, Sr, B, Sb, As, Be, Cd, Cr, Pb, Se, Ag, Ti, and Hg)	1-L glass or polyethylene bottle	HNO_3 to pH <2	180 days Hg has 28 days
Alkalinity	400 ml; HDPE	Cool to 4°C	
Anions (Br, Cl, F, SO_4)	75 ml glass or polyethylene bottle	Cool to 4°C	28 days
Nitrite/Nitrate-N	75 ml glass on polyethylene bottle	H_2SO_4 to pH <2	28 days
Tritium	100 ml glass bottle	None	6 months
Technicium-99	500 ml HDPE bottle	HNO_3 to pH <2	6 months
Iodine-129	8-L HDPE bottle	None	6 months
Strontium-90	1-L HDPE bottle	HNO_3 to pH <2	6 months
Plutonium isotopes (Pu-238, -239, -240)	1250 ml HDPE bottle	HNO_3 to pH <2	6 months
Pu-241	1250 ml HDPE bottle	HNO_3 to pH <2	6 months
Uranium isotopes (U-233/234, -235, -238)	500 ml HDPE bottle	HNO_3 to pH <2	6 months
Np-237	1-L HDPE bottle	HNO_3 to pH <2	6 months
Am-241	1-L HDPE bottle	HNO_3 to pH <2	6 months
Ce-137	500 ml HDPE bottle	HNO_3 to pH <2	6 months
VOCs	2 × 40 ml vials	H_2SO_4 to pH <2, Cool to 4°C	14 days

4.5.5 Groundwater Sample Prioritization

Due to the potential difficulties of sampling perched water and lysimeters, a sufficient volume of sample may not be available to meet all of the analytical needs. For this reason the available sample volume will be allocated to meet the project needs. The prioritization of analytical needs will be determined by the project technical lead and the FTL on a case by case basis.

4.6 Sampling Quality Assurance/Quality Control

Section 6 of this FSP and the Quality Assurance Project Plan (QAPjP) require quality assurance/quality control (QA/QC) samples from the aquifer and perched groundwater sampling. Laboratories approved by the SAM will be used for the analyses of all such samples. QA/QC samples will be collected at the frequency recommended in the QAPjP, but not less than one set per well set.

4.6.1 Groundwater QA/QC Samples

QA/QC samples are required only for the perched and aquifer wells and piezometers, not the suction lysimeters. Rinsate samples are required for samples collected from wells and piezometers.

QA/QC sampling of the suction lysimeters would be difficult because the sample volume is often limited. Should lysimeter sample volume be sufficient to permit collection of duplicate sample, one will be collected. If additional sample volume is available, duplicate samples will be collected at a frequency of 1 per 20 samples or 1 per day, whichever is less.

4.7 Corrective Actions

In the event a discrepancy is discovered by field personnel or auditors, some form of corrective action will be initiated. The level of action taken is related to the level of the discrepancy. Corrective actions can range from field changes due to unforeseen field conditions to DOE reportable incidents. All corrective actions will be addressed following applicable company policies and procedures.

5. SAMPLE CONTROL

Strict sample control is required of any project. Sample control assures that unique sample identifiers are used for separate samples. It also covers the documentation of sample collection information so that a sampling event may be reconstructed at a later date. The following sections detail unique sample designation, sample handling, including shipping, and radiological screening of samples.

5.1 Sample Designation

A systematic identification code is crucial for the unique identification of samples. Uniqueness is required for maintaining consistency within a project and preventing the same identification code from being assigned to more than one sample.

5.1.1 Sample Identification Code

A ten character identification code will be used for this project. The first through third character of the code refers to sample origination information. For example, **3BL** would be a sample from the WAG 3 Big Lost River well set drilling. The next five numbers designate the sequential sample number for the project. The last two characters of this set will be used to designate field duplicate samples (i.e., **01**, **02**). The final two characters identify a particular analysis. Refer to the Sampling and Analysis Plan (SAP) tables in Appendix A for specific analysis type designations.

An example of the numbering is given for a sample collected during well set drilling. Such a sample might be designated as "**3SL00301GX**," where (from left to right):

- **3SL** designates the sample as originating from the WAG 3 sewage (treatment) lagoon set well drilling

- **003** designates the sequential sample number (in this case the third sample collected)

- **01** designates the type of sample (**01** = original, **02** = field duplicate)

- **GX** designates the analysis to be performed (in this case the geotechnical suite).

A SAP table/database will be used to record all pertinent information associated with each sample identification code (see Appendix A).

5.1.2 Sampling and Analysis Plan Table/Database

5.1.2.1 General. A SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table/database, which is presented in Appendix A.

5.1.2.2 Sample Description Fields. The sample description fields contain information relating individual sample characteristics.

- ***Sampling Activity***—The sampling activity field contains the first six characters of the assigned sample number. The sample number in its entirety will be used to link information from other sources (field data, analytical data, etc.) to the information in the SAP table for data reporting, sample tracking, and completeness reporting. The sample number will also be used by the analytical laboratory to track and report analytical results.

- ***Sample Type—Data*** in this field will be selected from the following:
  - REG for a regular sample
  - QC for a QC sample.
- ***Media***—Data in this field will be selected from the following:
  - SOIL for regular and QA/QC samples of soil, alluvium, and interbed sediments
  - PERCHED WATER for water collected from the perched water zones
  - WATER for regular and QA/QC samples of pore, perched or groundwater.
- ***Collection Type***—Data in this field will be selected from the following:
  - GRAB for grab samples (undisturbed and disturbed core sample)
  - COMP for composite samples
  - TBLK for trip blanks
  - FBLK for field blanks
  - RNST for rinsates
  - DUP for duplicates.
- ***Sampling Method***—Data in this field is related to what the sample is taken from. For example, LYS designates a suction lysimeter sample. This field may be left blank.

5.1.2.3 Planned Date. This date is related to the planned sample collection start date.

5.1.2.4 Sample Location Fields. This group of fields pinpoints the exact location for the sample in three-dimensional space, starting with the general area, narrowing the focus to an exact location geographically, and then specifying the depth in the depth field.

Area—The area field identifies the general sample collection area. This field should contain the standard identifier for the INEEL area being sampled. For this investigation, samples are being collected from sites designated as the WAG 3 tank farm and percolation ponds. The area field identifier will correspond to these two sites.

Location—This field generally contains program specific information such as borehole or well identification number, but may contain geographical coordinates, x-y coordinates, building numbers, or other location identifying details. Data in this field will normally be subordinate to the area. This information is included on the labels generated by the Sample and Analysis Management (SAM) to aid field sampling personnel.

Type of Location—The type of location field supplies descriptive information concerning the exact sample location. Information in this field may overlap that in the location field, but it is intended to add detail to the location.

Depth—The depth of a sample location is the distance in feet from ground surface or a range in feet from the surface.

5.1.2.5 Analysis Types

AT1–AT20—These fields indicate analysis types (radiological, chemical, geotechnical, etc.) and number to be collected for each sample number. Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation is also provided for each analysis below the AT cell.

5.2 Sample Handling

Analytical samples for laboratory analyses will be collected in precleaned containers and packaged according to American Society for Testing and Materials, or EPA-recommended procedures. Samples for undisturbed geotechnical and physical analyses may be sent in lexan liners cut to length and capped. In this case, plastic end caps will be taped on to prevent sample loss during transit to the lab. The QA samples will be included to satisfy the QA/QC requirements for the field operation as outlined in the QAPjP (DOE-ID 2002b). Qualified (SAM approved) analytical and testing laboratories will analyze the samples.

5.2.1 Sample Preservation

Soil samples will be preserved as soon as practical after sample collection. All soil, rinsate, and QA/QC samples will be placed in coolers containing frozen, reusable ice packs immediately after sample collection, survey by the RCT, and logging by the field geologist. Samples requiring cooling, will be maintained at 4°C (39°F) for preservation immediately after sample collection through sample shipment as required. After preservation sample bottles will have chain-of-custody (CoC) seals attached.

5.2.2 Chain-of-Custody Procedures

The CoC procedures will be followed per applicable company policies and procedures and the QAPjP (DOE-ID 2002b). Sample containers will be stored in a secured area accessible only to the field team members.

5.2.3 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the Department of Transportation (DOT) (49 CFR Parts 171 through 178) and EPA sample handling, packaging and shipping methods (40 CFR 261.3). Samples will be packaged in accordance with the requirements set forth in applicable company policies and procedures.

5.2.3.1 Custody Seals. Custody seals will be placed on all shipping containers in such a way as to ensure that tampering or unauthorized opening does not compromise sample integrity. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment.

5.2.3.2 On-Site and Off-Site Shipping. An on-site shipment is any transfer of material within the perimeter of the INEEL. Site-specific requirements for transporting samples within INEEL boundaries and those required by the shipping and receiving department will be followed. Shipment within the INEEL boundaries will conform to DOT requirements as stated in 49 CFR. Off-Site sample shipment will be coordinated with Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

5.3 Radiological Screening

Following sample collection, samples will be surveyed for external contamination and field screened for radiation levels. If necessary, a gamma screening sample will be collected and submitted to either the INTEC Analytical Laboratory or the Radiation Measurements Laboratory, located at TRA-620, for a 20-minute analysis prior to shipment off-site. Determination of the need for radiological screening will be made by the RCT in the field.

If it is determined that the contact readings on the samples exceed 200 mR/hour beta/gamma, then the samples will be held for analysis in the INTEC Remote Analytical Laboratory.

6. QUALITY ASSURANCE/QUALITY CONTROL

A draft revision to QAPjP has been developed for WAGs 1, 2, 3, 4, 5, 6, 7, 10, and the Inactive Sites Department (DOE-ID 2002b). This plan pertains to all environmental, geotechnical, geophysical, and radiological testing, analysis, and data review. This section details the field elements of the QAPjP to support field operations during the implementation of this FSP.

6.1 Project Quality Objectives

QA objectives specify what measurements must meet to produce acceptable data for a project. The technical and statistical qualities of those measurements must be properly documented. Precision, accuracy, and completeness are quantitative parameters that must be specified for physical/chemical measurements. Comparability and representativeness are qualitative parameters.

QA objectives for this project will be met through a combination of field and laboratory checks. Field checks will consist of collecting field duplicates, equipment blanks, and field blanks. Laboratory checks consist of initial and continuing calibration samples, laboratory control samples, matrix spikes, and matrix spike duplicates. Laboratory QA is detailed in the QAPjP (DOE-ID 2002b) and is beyond the scope of this FSP.

6.1.1 Field Precision

Field precision is a measure of the variability not due to laboratory or analytical methods. The three types of field variability or heterogeneity are; spatially within a data population, between individual samples, and within an individual sample. Although the heterogeneity between and within samples can be evaluated using duplicate and/or sample splits, overall field precision will be calculated as the relative percent difference (RPD) between two measurements or relative standard deviation (RSD) between three or more measurements. The RPD or RSD will be calculated as indicated in the QAPjP (DOE-ID 2002b), for duplicate samples during the data validation process. Precision goals have been established for inorganic Contract Laboratory Program methods by the EPA (EPA 1993) and for radiological analyses in the SAM applicable company policies and procedures.

Duplicate samples to assess precision will be co-located and collected by field personnel at a minimum frequency of one duplicate for every 20 samples or one duplicate sample per well set, whichever is less, with the location of the QA/QC samples being rotation between sampling events so that each new well will have at least one QA/QC sample before the end of Phase II. These duplicates will be collected for both water (blanks) and soil (interbed) matrices. Sample identifications are provided in the SAP table presented in Appendix A. SAP tables and QA/QC sampling for the longer-term sampling, please refer to the long term monitoring plan (DOE-ID 2000a).

6.1.2 Field Accuracy

Cross contamination of the samples during collection or shipping could yield incorrect analytical results. To assess the occurrence of any cross contamination events, equipment blanks, and field blanks will be collected to evaluate any potential impacts. The goal of the sampling program is to eliminate any cross contamination associated with sample collection or shipping. To assist in this, boreholes will be drilled from the least contaminated area (south end of the facility) to the most contaminated (around the tank farm). Analytical results for these samples will be evaluated during the data validation process by sample delivery group. If necessary, the data will be blank-qualified to indicate the presence of cross contamination.

Field personnel will collect rinsate, equipment, and field blanks during the course of the project. Trip blanks will be collected whenever volatile organic compounds are scheduled for collection. The rinsate, equipment, and field blanks will be collected at a frequency of one every 20 samples or once for every sample day, which ever is less. Sample identifications are provided in the Sampling and Analysis Plan Table presented in Appendix A.

Performance evaluation samples will be submitted per DOE-ID (2002b). For this FSP one PE sample will be submitted with the Phase I sampling and one with the initial Phase II sampling.

6.1.3 Representativeness

Representativeness is evaluated by assessing the accuracy and precision of the sampling program and expressing the degree to which samples represent actual site conditions. In essence, representativeness is a qualitative parameter that addresses whether the sampling program was properly designed to meet the DQOs. The representativeness criterion is best satisfied by confirming that sampling locations are selected properly and a sufficient number of samples are collected to meet the requirements stated in the DQOs. The DQOs are identified in Section 3.1 of this FSP.

6.1.4 Comparability

Comparability is a qualitative measure of the confidence with which one data set can be compared to another. These data sets include data generated by different laboratories performing this work, data generated by laboratories in previous studies, data generated by the same laboratory over a period of several years, or data obtained using differing sampling techniques or analytical protocols. For field aspects of this program, data comparability will be achieved using standard methods of sample collection and handling. Procedures identified to standardize the sample collection and handling are include in applicable company policies and procedures

6.1.5 Completeness

Field completeness will be assessed by comparing the number of samples collected to the number of samples planned. Field sampling completeness is affected by such factors as equipment and instrument malfunctions and insufficient sample recovery. Completeness can be assessed following data validation and reduction. The completeness goal for this project is 100% for critical activities and 90% for noncritical activities. A critical activity for this project is defined as the successful installation of a lysimeter, tensiometer, or monitoring well. Noncritical activities are defined as the successful collection of an individual sample. All individual samples from performance measurement point wells that contain enough water to collect a sample are considered critical.

6.2 Field Data Reduction

The reduction of field data is an important task to ensure that errors in sample labeling and documentation have not been made. This includes cross-referencing the SAP Table presented in Appendix A with sample labels, logbooks, and the CoC forms. Prior to sample shipment to the laboratory, field personnel will ensure that all field information is properly documented.

6.3 Data Validation

All laboratory generated data will be validated to Level A. Data validation will be performed in accordance with applicable company policies and procedures. Field generated data (e.g., matric potential measurements and water levels) will be validated through the use of properly calibrated instrumentation, comparing and cross checking data with independently gathered data, and recording data collection activities in a bound field logbook.

6.4 QA Objectives for Measurement

The QA objectives are specifications that the monitoring and sampling measurements identified in the QAPjP (DOE-ID 2002b) must meet to produce acceptable data for the project. The technical and statistical quality of these measurements must be properly documented. Precision, accuracy, method detection limits, and completeness must be specified for hydraulic and chemical measurements. Specific QA objectives are specified in the QAPjP for WAGs 1, 2, 3, 4, 5, 6, 7, 10, and inactive sites (DOE-ID 2002b).

7. PROJECT ORGANIZATION AND RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work, while minimizing the risks to worker health and safety. As outlined in the FFA/CO each of the three signatory agencies (DOE, EPA, IDEQ) has assigned a WAG project manager (PM). The WAG project manager's responsibility is to oversee the effective implementation of actions stated in final action documents (i.e., the OU 3-13 ROD). This section is divided into two subsections that outline the responsibilities of key BBWI work-site personnel only. Section 7.1 discusses key personnel who will be directly associated with the job site (i.e., on-Site personnel). Section 7.2 discusses those positions that will supply support for the activities in the field but are not required to be on-Site. Job titles of the individuals who will be filling key roles at the work site, and lines of responsibility and communication are shown on the chart in Figure 7-1. NOTE: Ongoing changes in INEEL and EM organizational structures may result in modifications to organization hierarchy and/or job titles and descriptions.

7.1 Job-Site Personnel

7.1.1 Project Manager

The PM coordinates all document preparation, field, laboratory, and modeling activities associated with this project and is responsible for the overall scope, schedule and budget of this project. The PM shall ensure that all activities conducted during the project comply with the following:

- INTEC site director requirements as outlined applicable company policies and procedures
- All applicable Occupational Safety and Health Administration (OSHA), EPA, DOE, DOT, and State of Idaho requirements
- The QAPjP (DOE-ID 2002b), the project HASP, the project WMP, and this FSP.

The PM will oversee preparation, review, and implementation of this FSP to ensure work is performed as planned. The PM is responsible for (1) developing resource loaded, time-phased control account plans based on the project technical requirements, budgets, and schedules, and (2) assigning project tasks. Other functions and responsibilities of the PM related to completion of field activities include the following:

- Developing the site-specific plans required by the Environmental Restoration (ER) program such as work plans, environmental safety and health (ES&H) plans, SAPs, etc.
- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the FFA/CO Attachment A "Action Plan for Implementation of the Federal Facility Agreement and Consent Order" (DOE-ID 1991) and applicable guidance
- Coordinating and interfacing with units within the program support organization on issues relating to QA, ES&H, and NEPA support for the project

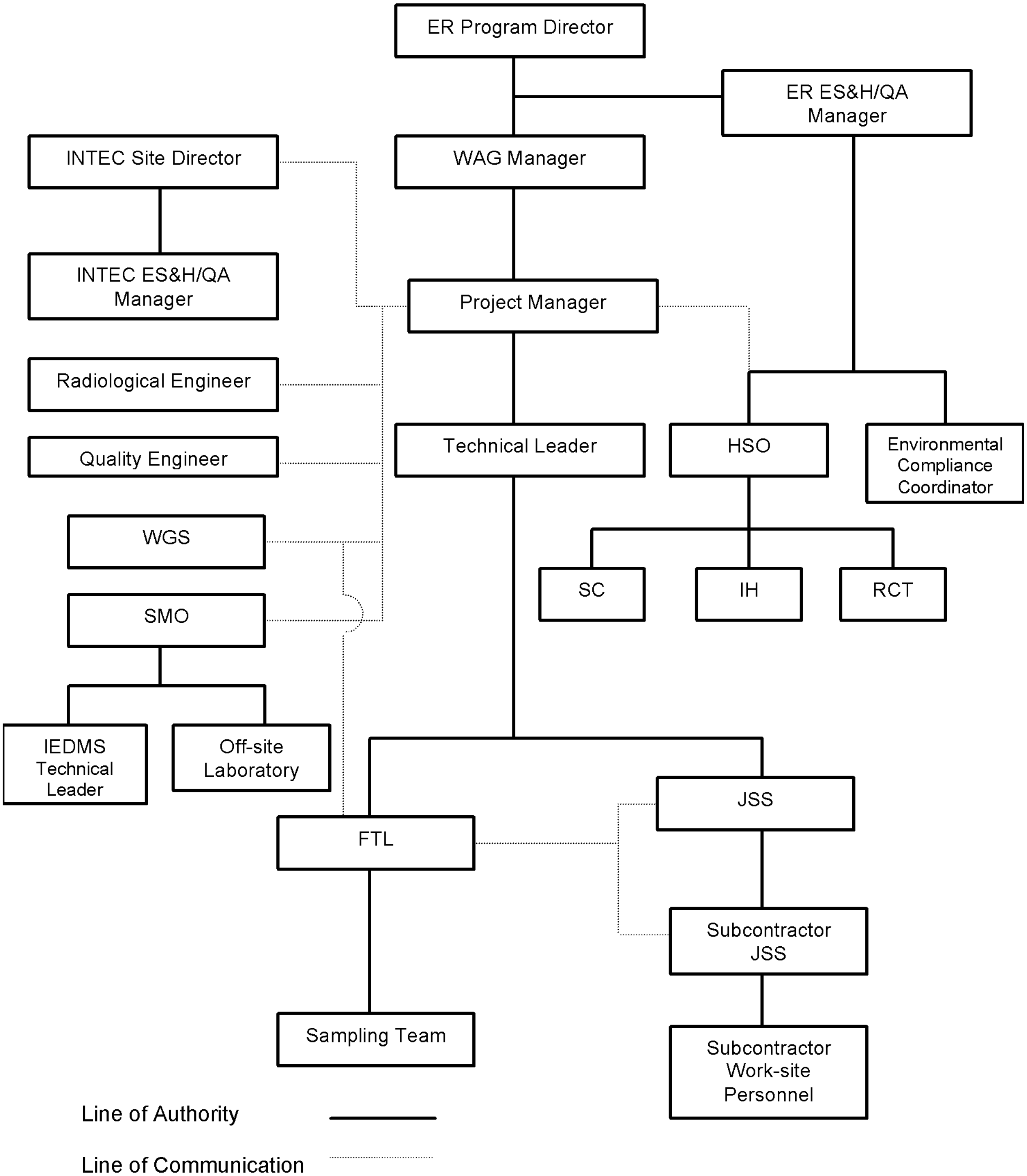

Figure 7-1. Project organizational structure.

- Coordinating the site-specific data collection, review for technical adequacy, and data input to an approved database such as the Environmental Restoration Information System (ERIS)

- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

7.1.2 Technical Lead

The technical lead (TL) is assigned by the PM to provide technical expertise and oversees the preparation, review, and implementation of the FSP to ensure work is technically correct. The TL works with the PM to ensure that:

- Site-specific plans required by the ER program such as work plans, ES&H plans, SAPs, etc. are prepared

- Activities and deliverables meet schedule and scope requirements as described in the FFA/CO Attachment A "Action Plan for Implementation of the Federal Facility Agreement and Consent Order" (DOE-ID 1991) and applicable guidance

- Resolves issues relating to QA, ES&H, and NEPA support for the project.

The TL may function as the FTL at the job site. The TL is the primary contact for any questions related to the various work tasks associated with this project.

7.1.3 Field Team Leader

The FTL represents the ER organization at the job site with delegated responsibility for the safe and successful completion of the project. The FTL works with the PM to manage field sampling operations, and execution of the work plan. The FTL enforces work-site control, documents activities, and may conduct the daily safety briefings at the start of the shift. Health and safety issues must be brought to the attention of the FTL.

If the FTL leaves the job site, an alternate individual will be appointed to act as the FTL. Persons who act as the FTL on the job site must meet all the FTL training requirements as outlined in the project HASP. The identity of the acting FTL shall be conveyed to work-site personnel, recorded in the FTL logbook, and communicated to the INTEC director, or designee, when appropriate.

The FTL shall comply with the requirements outlined in applicable company policies and procedures by completing the briefings and reviews, and submitting the documentation to the INTEC site director and ER Environment Safety & Health/Quality Assurance (ES&H/QA) manager. The FTL shall complete the Job Requirements Checklist (JRC) as per applicable company policies and procedures.

The FTL shall be responsible for ensuring compliance with waste management requirements and coordinate such activities with the environmental compliance coordinator and/or designee.

7.1.4 Health and Safety Officer

The Health and Safety Officer (HSO) is the person located at the work site who serves as the primary contact for health and safety issues. The HSO shall assist the FTL on all aspects of health and safety (which includes complying with the enhanced work planning process), and is authorized to stop work at the work site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as stated in other sections of the project HASP, as long as they do not interfere with the primary responsibilities stated here. The HSO is authorized to verify compliance to the HASP, conduct inspections, monitor decontamination procedures, and require and monitor corrective actions, as appropriate. Other ES&H professionals at the work site (safety coordinator [SC], industrial hygienist [IH], RCT, radiological engineer, environmental compliance coordinator, and facility representative[s]), may support the HSO, as necessary.

Persons assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SC, or in some cases the FTL (depending on the hazards, complexity and size of the activity involved, and required concurrence from the ER ES&H/QA manager) at the work site, other task-site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the work site.

If it is necessary for the HSO to leave the work site, an alternate individual will be appointed by the HSO to fulfill this role. The identity of the acting HSO will be recorded in the FTL logbook, and work-site personnel will be notified.

7.1.5 Industrial Hygienist

The assigned IH is the primary source for information regarding nonradiological hazardous and toxic agents at the task site. The IH shall assist the FTL in completing the job requirements checklist (JRC) and assesses the potential for worker exposures to hazardous agents according to the contractor manual, applicable company policies and procedures, and accepted industry IH practices and protocol. By participating in work-site characterization, the IH assesses and recommends appropriate hazard controls for the protection of work-site personnel, operates and maintains airborne sampling and monitoring equipment, reviews for effectiveness, and recommends and assesses the use of personal protective equipment (PPE) required in the project HASP (recommending changes as appropriate).

Following an evacuation, the IH, in conjunction with other recovery team members, will assist the FTL in determining whether conditions exist for safe work-site reentry as described in the project HASP. Personnel showing health effects (signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an Occupational Medical Program (OMP) physician by the IH, their supervisor, or the HSO. The IH may have other duties at the work site, as specified in the project HASP, and/or applicable company policies and procedures. During emergencies involving hazardous materials, airborne sampling, and monitoring results will be coordinated with members of the Emergency Response Organization.

7.1.6 Radiological Control Technician

The assigned RCT is the primary source for information and guidance on radiological hazards. The RCT will be present at the job site during any work operations when a radiological hazard to personnel may exist or is anticipated. The RCT shall also assist the FTL in completing the JRC. Responsibilities of the RCT include radiological surveying of the work site, equipment, and samples; providing guidance for radioactive decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the FTL of any radiological occurrence that must be reported as directed by company manuals. The RCT may have other duties at the job site as specified in the project HASP, and/or applicable company policies and procedures.

7.1.7 Field Geologist

The field geologist will be responsible for the proper identification and logging of all collected core samples. In consultation with the PM, and FTL, the field geologist will recommend optimum locations for borehole instrumentation based on core and geophysical data. The field geologist will also oversee all downhole instrumentation installation performed by a subcontractor (i.e., drilling contractor).

7.1.8 Job-Site Supervisor

The job site supervisor (JSS) serves as the representative for the Facilities, Utilities, and Maintenance (FUM) Department, Site Services Branch at the task site. The JSS is the supervisor of crafts and other FUM personnel assigned to work at the job site. The JSS is the interface between FUM and ER, and works closely with the FTL at the work site to ensure that the objectives of the project are accomplished in a safe and efficient manner. The JSS and FTL work as a team to accomplish day-to-day operations at the job site, identify and obtain additional resources needed at the job site, and interact with the HSO, IH, SC, RCT, and/or radiological engineer on matters regarding health and safety. The JSS, like the FTL, must be informed about any health and safety issues that arise at the work site and may stop work at the job site if an unsafe condition exists. The JSS also shares the FTL's responsibility for daily prejob briefings.

7.1.9 Subcontractor Job-Site Supervisor

A subcontractor JSS serves as the subcontractor safety representative at the work site. The subcontractor JSS may also serve as the subcontractor PM. The subcontractor JSS is the subcontractor field supervisor for subcontractor personnel assigned to work at the job site. The subcontractor JSS and FTL work as a team to accomplish day-to-day operations at the work site, identify and obtain additional resources needed at the work site, and interact with the HSO, IH, SC, RCT, and/or radiological engineer on matters regarding health and safety. The subcontractor JSS, like the FTL, must be informed about any health and safety issues that arise at the work site and may stop work at the job site if an unsafe condition exists. The subcontractor JSS will provide information to the FTL regarding the nature of their work for input at the daily prejob briefing.

7.1.10 Sampling Team

The sampling team will perform the onsite tasks necessary to collect, package, and ship samples. Tasks may include the physical collection of sample material, completion of CoC and shipping request forms, and proper packaging of samples in accepted shipping containers (properly labeled and sealed coolers). The size and makeup of the sampling team will be dependent on the extent of the sampling task. The IH and RCT will support the sampling team when sampling is performed inside the contamination area. The sampling team may be lead by the FTL or a designated sample team lead (STL).

7.1.11 Work-Site Personnel

All work-site personnel shall understand and comply with the requirements of the project HASP. The FTL or JSS will brief work-site personnel at the start of each shift. During the prejob briefing all daily tasks, associated hazards, engineering and administrative controls, required PPE, work control documents, and emergency conditions and actions will be discussed. Input from the project HSO, IH, and RCT, and/or radiological engineer to clarify task health and safety requirements will be provided. All personnel are encouraged to ask questions regarding site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on the lessons learned from previous days' activities.

Once at the job site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL, JSS, or HSO for corrective action. **All work-site personnel are authorized to stop work immediately if they perceive that an unsafe condition poses an imminent danger. They must then notify the FTL, JSS, or HSO of the unsafe condition.**

7.2 Supporting Personnel

7.2.1 Environmental Restoration Director

The ER director has ultimate management and operation (M&O) contractor responsibility for the technical quality of all projects, maintaining a safe environment, and the safety and health of all personnel during field activities performed by or for the ER program. The ER director provides technical coordination and interfaces with the DOE-ID. The ER director ensures that

- Project/program activities are conducted according to all applicable federal, state, local, and company requirements and agreements
- Program budgets and schedules are approved and monitored to be within budgetary guidelines
- Personnel, equipment, subcontractors, and services are available
- Direction is provided for the development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports.

7.2.2 INTEC Site Director

The INTEC site director has the authority and responsibility to ensure proper ownership review of all activity within the INTEC facility for all work processes and work packages including, but not limited to, the following:

- Establishing and executing monthly, weekly, and daily operating plans
- Executing the INTEC ES&H/QA program
- Executing the Integrated Safety Management System for INTEC
- Executing the Enhanced Work Planning for INTEC
- Executing the Voluntary Protection Program in the area
- All environmental compliance within the area
- Executing that portion of the voluntary compliance order that pertains to the area

- Correcting the root cause functions of the accident investigation in the area
- Correcting the root cause functions of the voluntary compliance order for the area.

7.2.3 ER S&H/QA Manager

The ER safety and health/quality assurance (S&H/QA) manager or designee is responsible for ensuring that ES&H oversight is provided for all ER programs and projects. This position reports to and is accountable to the ER director. The ER S&H/QA manager performs line management review, inspections, and oversight in compliance with applicable company policies and procedures. Project or program management shall bring all S&H/QA concerns, questions, comments, and disputes that cannot be resolved by the HSO or one of the assigned ES&H professionals to the ER S&H/QA manager or respective compliance officer.

7.2.4 INTEC S&H/QA Manager

The INTEC S&H/QA manager or designee is responsible for ensuring that ES&H oversight is provided for WAG 3 ER projects performed at or adjacent to the INTEC facility. This position reports to and is accountable to the INTEC site director. The INTEC S&H/QA manager performs line management review, inspections, and oversight in compliance with applicable company policies and procedures. Project or program management shall bring all S&H/QA concerns, questions, comments, and disputes that cannot be resolved by the HSO or one of the assigned ES&H professionals to the ER S&H/QA manager or to the INTEC S&H/QA manager.

7.2.5 Safety Coordinator

The assigned SC reviews work packages, periodically observes work-site activity, assesses compliance with the contractor manual, signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the work site. The SC shall assist the FTL in completing the JRC. The SC may have other duties at the work site as specified in the project HASP, and/or applicable company policies and procedures. The fire protection engineer's function is included under the SC designation, and is the person assigned to review work packages and perform field assessments for fire protection controls.

7.2.6 Radiological Engineer

The radiological engineer is the primary source for information and guidance relative to the evaluation and control of radioactive hazards at the work site. If a radiological hazard exists or occurs at the job site, the radiological engineer makes recommendations to minimize health and safety risks to work-site personnel. Responsibilities of the radiological engineer include: (1) performing radiation exposure estimates and as low as reasonably achievable (ALARA) evaluations, (2) identifying the type(s) of radiological monitoring equipment necessary for the work, (3) advising the FTL and RCT of changes in monitoring or PPE, and (4) advising personnel on work-site evacuation and reentry. The radiological engineer may have to perform evaluations specified in applicable company policies and procedures for release of materials with inaccessible surfaces. The radiological engineer may also have other duties to perform as specified in the project HASP, or in company manuals.

7.2.7 Environmental Restoration Quality Engineer

The ER quality engineer provides guidance on work-site quality issues, when requested. The ER quality engineer observes work-site activities and verifies that work-site operations comply with quality requirements pertaining to these activities. The ER quality engineer identifies activities that do not comply or have the potential for not complying with quality requirements and suggests corrective actions.

7.2.8 Sample and Analysis Management

The INEEL SAM has the responsibility of obtaining necessary laboratory services as required to meet the needs of this project. They will also ensure that data generated from samples meet the needs of the project by validating all analytical laboratory data to resident protocol, and ensuring that data is reported to the project in a timely fashion as required by the FFA/CO.

The SAM contracted laboratory will have overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include preparing analytical reports, ensuring CoC information is complete, and ensuring all QA/QC procedures are implemented in accordance with SAM generated task order statements of work and master task agreements.

7.2.9 Integrated Environmental Data Management System Technical Leader

The Integrated Environmental Data Management System (IEDMS) Technical Leader will interface with the PM during the preparation of the SAP database. This individual also provides guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 2002b). The numbers used by the project are unique from all others ever assigned by IEDMS. The preparation of the plan database, along with completion of the SAM request services form, initiates the sample and sample waste tracking activities performed by the SAM.

7.2.10 Waste Generator Services

Waste Generator Service (WGS) personnel provide support to the project in the area of waste segregation, storage, and disposal. For this project a WGS engineer will be assigned to take care of all waste generated from the tasks conducted for this project.

7.2.11 Occasional Workers

All persons who may be on the project work site, but are not part of the field team, are considered occasional workers for the purposes of this project (e.g., surveyor, or other crafts personnel not assigned to the project). A person shall be considered "onsite" when they are present in or beyond the designated support zone. Occasional workers per 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926.65, and must meet minimum training requirements for such workers as described in the OSHA standard and any additional site-specific training as identified in the project HASP.

All occasional workers, including contractor and subcontractor employees who are not working on the project, or nonessential representatives of DOE and/or state or federal regulatory agencies, may not proceed beyond the support zone without receiving job-specific HASP training, signing a job-specific HASP training acknowledgement form, receiving a full safety briefing, wearing the appropriate PPE, and providing proof of meeting the minimum training requirements specified in the project HASP. A fully trained job-site representative (such as the FTL, JSS, HSO, or a designated alternate) will escort occasional workers at all times while on the task site.

7.2.12 Visitors

All visitors with official business at the project task site, including contractor and subcontractor personnel, representatives of DOE, and/or state or federal regulatory agencies, may not proceed beyond the support zone without receiving project-specific HASP training, signing a HASP training acknowledgement form, receiving a full safety briefing, wearing the appropriate PPE, and providing proof of meeting the minimum training requirements as specified in the project HASP. A fully trained job-site representative (such as the FTL, JSS, or HSO, or a designated alternate) will escort visitors at all times while at the work site.

A casual visitor to the work site is a person who does not have a specific task to perform or other official business to conduct at the work site. **Casual visitors are not permitted at the job site(s) for the Group 4 perched water well drilling.**

8. WASTE MANAGEMENT

This section is intended to briefly summarize the project specific waste management plan (DOE-ID 2000d) and to familiarize field personnel with the various wastes to be encountered on the job site. For a full discussion of the waste management for this project, see *Waste Management Plan for Operable Unit 3-13, Group 4 Perched Water* (DOE-ID 2000d). Remediation waste generated during the OU 3-13 Group 4 perched water well drilling project may include the following:

- Contaminated personal protective equipment, wipes, bags and other refuse
- Contaminated drilling and sampling equipment
- Well development fluids
- Well development fluids
- Aqueous decontamination solutions
- Unused, unaltered sample material, and drill cuttings
- Soil drill cuttings
- Used sample containers and disposable sampling equipment
- Aqueous and liquid organic analytical wastes
- Analytical debris (e.g., glassware, pipettes).

The disposition and handling of waste for this project will be consistent with applicable company policies and procedures. However, field personnel will be responsible for the initial segregation of waste based on drilling conditions and/or location. The segregation of waste will play an important role in the reduction of waste generated by this project. As such, waste minimization and segregation are discussed below.

8.1 Waste Minimization and Segregation

Waste minimization for this project will be primarily achieved through design and planning to ensure efficient operations and that wastes are not generated unnecessarily. Sampling and drilling personnel will be responsible for segregating conditional industrial wastes from contaminated wastes. All contained wastes will be marked with information regarding the area from which it was generated. This will facilitate proper classification of the wastes following receipt of sampling and analysis results.

The segregation of waste will be based upon the area of drilling and whether the waste was produced while drilling in a zone of saturation. For example, waste generated while drilling well sets 1 through 3 should be contained, since these wells are located in areas of known vadose contamination. For the Phase I well sets only waste generated from saturated strata requires containment, since any contaminants present are associated with perched and aquifer water. Table 8-1 provides a summary of the waste segregation strategy.

Table 8-1. Waste segregation summary.

Well Set	Waste	Disposition	Justification
Phase I well sets	Dry drill cuttings	Dispose at site	No known or anticipated surface contamination
	Saturated drill cuttings	Containerize in drums or polytanks	Known contamination present in perched and aquifer water
Phase II well sets	Dry drill cuttings	Dispose at site	No known or anticipated surface contamination
	Saturated drill cuttings	Containerize in drums or polytanks	Known contamination present in perched and aquifer water
Decon fluids	Generated from unsaturated zone	Dispose to ground as directed	No known or anticipated surface contamination
	Generated from saturated zone	Containerize in drums or polytanks	Known contamination present in perched and aquifer water
	Well development fluid	Containerize in drums or polytanks	Known contamination present in perched and aquifer water
	Purge water	Containerize in drums or polytanks	Known contamination present in perched and aquifer water

Field personnel will be responsible for segregating contaminated liquid wastes from nonliquid wastes and contaminated combustible solid wastes from noncombustible solid wastes. All wastes containers will be labeled with information regarding the characteristics of the wastes (e.g., liquid, combustible solid, noncombustible solid). Decontamination fluids from potentially contaminated equipment will be contained separately from decontamination fluids generated from noncontaminated areas.

Sampling and drilling equipment and debris that cannot be decontaminated in accordance with the field procedure will be contained for subsequent management. Depending on the nature of the contaminated equipment, it may be stored for subsequent use at other contaminated sites, subjected to a more rigorous decontamination, or disposed of as a waste.

9. HEALTH AND SAFETY

A project-specific HASP (INEEL 2002) has been prepared to define the health and safety requirements for this project. This HASP establishes the procedures and requirements used to minimize health and safety risks to persons working on the OU 3-13, SRPA project. The HASP meets the requirements of the OSHA Standard, 29 CFR 1910.120, 29 CFR 1926.65, *Hazardous Waste Operations and Emergency Response* (HAZWOPER). The document's preparation is consistent with information found in the following references:

- National Institute of Occupational Safety and Health (NIOSH/OSHA/United States Coast Guard (USCG)/U.S. Environmental Protection Agency (EPA) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH 1985)

- Company manuals.

The HASP complies with the authorized safety basis detailed in INTEC's authorized safety basis and "Other Industrial" classification per the applicable preliminary hazard assessment, auditable safety analysis, or safety analysis report, if applicable.

The HASP governs all work support of the OU 3-13 that is performed by the INEEL personnel and INEEL subcontractors, or employees of other companies. Persons not normally assigned to work at the site, such as representatives of DOE, DOE-ID, the State of Idaho, OSHA, and EPA are considered occasional workers as stated in OSHA 29 CFR 1910.120 and 29 CFR 1926.65.

Prior to sending this document to the Environmental Protection Agency and the Idaho Department of Health and Welfare (IDHW), the HASP will be reviewed and revised by the HSO in conjunction with the FTL, and the INEEL ER SH&QA manager, or designee, to ensure the effectiveness and suitability of this HASP.

10. DOCUMENT MANAGEMENT

This section summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures, CoC forms, and sample container labels. The analytical results from this field investigation will be documented in reports and used as input for refining the current conditions for the computer model.

10.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records, and for verifying that all required documents to be submitted to INEEL SAM are maintained in good condition. All entries will be made in indelible black ink. Errors will be corrected by drawing a single line through the error, and entering the correct information. All corrections will be initialed and dated.

10.1.1 Sample Container Labels

Waterproof, gummed labels generated from the SAP database will display information such as the unique sample identification number, the name of the project, sample location, and analysis type. Labels will be completed and placed on the containers in the field before collecting the sample. Sample team members will provide information necessary for label completion. Such information may include sample date, time, depth, preservative used, field measurements of hazards, and the sampler's initials.

10.1.2 Field Guidance Form

Field guidance forms verifying unique sample numbers provided for each sample location can be generated from the SAP database. These forms contain the following information:

- Media
- Sample identification numbers
- Sample location
- Aliquot identification
- Analysis type
- Container size and type
- Sample preservation.

10.1.3 Field Logbooks

Field logbooks will be used to record information necessary to interpret the analytical data in accordance with INEEL SAM format, and controlled and managed according to applicable company policies and procedures.

10.1.3.1 Field Team Leader's Daily Logbook. A project logbook maintained by the FTL will contain a daily summary of the following:

- All field team activities necessary to reconstruct the events and methods used to accomplish the objectives of this FSP
- Visitor log (a site visitor logbook may be assigned to record this information)
- List of site contacts
- Problems encountered
- Any corrective actions taken as a result of field audits.

This logbook will be signed and dated at the end of each day's sampling activities.

10.1.3.2 Sample Logbooks. Sample logbooks will be used by the sample team(s). Each sample logbook will contain information such as the following:

- Physical measurements
- All QC samples
- Sample information (sample location, sample collection information, analyses requested for each sample, sample matrix)
- Shipping information (collection dates, shipping dates, cooler identification number, destination, CoC number, name of shipper).

10.1.3.3 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment requiring periodic calibration or standardization. This logbook will contain logsheets to record the date, time, method of calibration, and instrument identification number.

10.1.4 Photographs

It is not anticipated that formal photographic records of the activities under this FSP will be made. Photographs may be taken by field personnel to record general equipment set-ups and installation procedures. A minimum of two copies will be made of any photographs taken during this project. One copy will be placed in the project file. The second copy will accompany other project documents (i.e., field logbooks) to be placed in the ER Document Control and Records Management files.

10.2 Document Revision Requests

Revisions to this, or any referenced document, will follow applicable company policies and procedures. Final changes must also be approved through the supervising Agencies since this is a primary FFA/CO document.

11. REFERENCES

29 CFR 1910.120, 1999, "Hazardous waste operations and emergency response," *Code of Federal Regulations*, Office of the Federal Register, July 1999.

29 CFR1926.65, 1999, "General Interpretations," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 141, 1999, "National Primary Drinking Water Regulations," *Code of Federal Regulations*, Office of the Federal Register, July 1999.

40 CFR 230, 1999, "Section 404(b)1, Guidelines for Specification of Disposal Sites for Dredge or Fill Material," *Code of Federal Regulations*, Office of the Federal Register, July 1999.

40 CFR 261.3, 1999, "Definition of hazardous waste," *Code of Federal Regulations*, Office of the Federal Register, July 1999.

49 CFR 171, 1999, "General Information, Regulations, and Definitions," *Code of Federal Regulations,* Office of the Federal Register, October 1999.

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49 CFR 173, 1999, "Shippers-General Requirements for Shipments and Packaging," *Code of Federal Regulations,* Office of the Federal Register, October 1999.

49 CFR 174, 1999, "Carriage By Rail," *Code of Federal Regulations*, Office of the Federal Register, October 1999.

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DOE-ID, 2000c, *Health and Safety Plan for Waste Area Group 3, Operable Unit 3-13, Group 4 Post Record of Decision Vadose Zone Well Drilling and Monitoring*, INEEL/EXT-99-00257, Department of Energy Idaho Operations Office, September 2000.

DOE-ID, 2000d, *Waste Management Plan for Operable Unit 3-13, Group 4 Perched Water*, DOE/ID-10749, Rev. 0, Department of Energy Idaho Operations Office, September 2000.

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Appendix A

Sampling and Analysis Tables

Plan Table Number: WAG3 GRP4 PW3

SAP Number:

Date: 01/23/2003 Plan Table Revision: 6.0 Project: WAG 3 GROUP 4 PHASE IIA - YEAR 2003 Project Manager: GIANOTTO, D. F. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	A4	AN	R4	UD	N2	NP	R7	RB	XK	EA	LA	LL	R8	R9					
PWM300	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	33-1	89-99	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM301	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	33-2	86-106	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM302	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	33-3	112-122	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM303	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	33-4-2	98-118	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM304	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	37-4	100-110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM305	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	55-06	93-113	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM306	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-1-4	326-336	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM307	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-1-1	359-369	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM308	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-2	102-112	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM309	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-3	116-118	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM310	REG	PERCHED WATER	DUP		02/10/2003	INTEC	PERCHD WATR WEL	MW-4-2	101-111	2	2	2	2	2	2	2	2	2		2	2	2	2	2					
PWM311	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-4-1	128-130	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM312	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-5	106-126	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM313	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-6-2	117-137	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM314	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-7-2	132-142	1	1	1	1	1	1	1	1	1		1	1	1	1	1					

The sampling activity displayed on this table represents the first six characters of the sample identification number. The complete sample identification number (10 characters) will appear on field guidance forms and sample labels.

AT1: Alkalinity
AT2: Am-241
AT3: Anions
AT4: Gamma Spec
AT5: Iodine-129 (low detection level)
AT6: Nitrate/Nitrite
AT7: Np-237
AT8: Pu-Iso
AT9: Sr-90
AT10: Stable Isotopes

AT11: Tc-99
AT12: Total Metals (TAL)
AT13: Total Metals (TAL) - Filtered
AT14: Tritium
AT15: U-Iso
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Stable Isotopes - Conditional samples based on off-site collabrative efforts.

AT12 Total Metals (TAL) = Unfiltered
AT13 Total Metals (TAL) - Filtered samples will be filtered in the field prior to shipment

AT12 Total Metals (TAL) and AT13 Total Metals (TAL) - Filtered = Calcium, Magnesium, Sodium, Potassium, Strontium, Antimony, Arsenic, Barium, Boron, Beryllium, Cadmium, Chromium, Lead, Silver, Thallium

Anions - Bromide, Chloride, Fluoride, Sulfate

Alkalinity = Total

Analysis Suites:

Contingencies:

Plan Table Number: WAG3 GRP4 PW3

SAP Number:

Date: 01/23/2003 Plan Table Revision: 6.0 Project: WAG 3 GROUP 4 PHASE IIA - YEAR 2003 Project Manager: GIANOTTO, D. F. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	A4	AN	R4	UD	N2	NP	R7	RB	XK	EA	LA	LL	R8	R9					
PWM315	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-9-2	120-130	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM316	REG	PERCHED WATER	DUP		02/10/2003	INTEC	PERCHD WATR WEL	MW-10	141-151	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
PWM317	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-15	111-131	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM318	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-17-2	182-192	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM319	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-17-4	360-381	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM320	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-18-1	394-414	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM321	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-20-2	133-148	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM322	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	MW-24	53-73	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM323	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PW-1	100-120	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM324	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PW-2	111-131	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM325	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PW-3	103-123	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM326	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PW-4	110-150	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM327	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PW-5	109-129	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM328	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	USGS-050	357-405	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM329	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	BLR-DP	380-420	1	1	1	1	1	1	1	1	1		1	1	1	1	1					

The sampling activity displayed on this table represents the first six characters of the sample identification number. The complete sample identification number (10 characters) will appear on field guidance forms and sample labels.

AT1: Alkalinity
AT2: Am-241
AT3: Anions
AT4: Gamma Spec
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AT6: Nitrate/Nitrite
AT7: Np-237
AT8: Pu-Iso
AT9: Sr-90
AT10: Stable Isotopes

AT11: Tc-99
AT12: Total Metals (TAL)
AT13: Total Metals (TAL) - Filtered
AT14: Tritium
AT15: U-Iso
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:

Stable Isotopes - Conditional samples based on off-site collabrative efforts.

AT12 Total Metals (TAL) = Unfiltered

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AT12 Total Metals (TAL) and AT13 Total Metals (TAL) - Filtered = Calcium, Magnesium, Sodium, Potassium, Strontium, Antimony, Arsenic, Barium, Boron, Beryllium, Cadmium, Chromium, Lead, Silver, Thallium

Anions - Bromide, Chloride, Fluoride, Sulfate

Alkalinity = Total

Analysis Suites:

Contingencies:

Plan Table Number: WAG3 GRP4 PW3

SAP Number:

Date: 01/23/2003 Plan Table Revision: 6.0 Project: WAG 3 GROUP 4 PHASE IIA - YEAR 2003 Project Manager: GIANOTTO, D. F. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										A1	A4	AN	R4	UD	N2	NP	R7	RB	XK	EA	LA	LL	R8	R9					
PWM330	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	STL-DP	380-420	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM331	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PP-DP-4	380-420	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM332	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	CS-DP	380-420	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
PWM333	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	BLR-CH-2	130	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM334	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PP-CH	255	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM335	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	PERCHD WATR WEL	PP-DP-1	35	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM336	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	33-2	TBD	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM337	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	33-3	TBD	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM338	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	A-SERIES-1	TBD	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM339	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	A-SERIES-2	TBD	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM340	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	BLR-AL	32.3	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM341	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	STL-AL	26	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM342	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	STL-SP	103.3	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM343	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	PP-AL	26.6	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM344	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	PP-SP	108.8	1	1	1	1	1	1	1	1	1		1	1	1	1	1					

The sampling activity displayed on this table represents the first six characters of the sample identification number. The complete sample identification number (10 characters) will appear on field guidance forms and sample labels.

AT1: Alkalinity
AT2: Am-241
AT3: Anions
AT4: Gamma Spec
AT5: Iodine-129 (low detection level)
AT6: Nitrate/Nitrite
AT7: Np-237
AT8: Pu-Iso
AT9: Sr-90
AT10: Stable Isotopes

AT11: Tc-99
AT12: Total Metals (TAL)
AT13: Total Metals (TAL) - Filtered
AT14: Tritium
AT15: U-Iso
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:

Stable Isotopes - Conditional samples based on off-site collabrative efforts.

AT12 Total Metals (TAL) = Unfiltered

AT13 Total Metals (TAL) - Filtered samples will be filtered in the field prior to shipment

AT12 Total Metals (TAL) and AT13 Total Metals (TAL) - Filtered = Calcium, Magnesium, Sodium, Potassium, Strontium, Antimony, Arsenic, Barium, Boron, Beryllium, Cadmium, Chromium, Lead, Silver, Thallium

Anions - Bromide, Chloride, Fluoride, Sulfate

Alkalinity = Total

Analysis Suites:

Contingencies:

Plan Table Number: WAG3 GRP4 PW3

SAP Number:

Date: 01/23/2003 Plan Table Revision: 6.0 Project: WAG 3 GROUP 4 PHASE IIA - YEAR 2003 Project Manager: GIANOTTO, D. F. SMO Contact: KIRCHNER, D. R.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
										AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	A1	A4	AN	R4	UD	N2	NP	R7	RB	XK	EA	LA	LL	R8	R9					
PWM345	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	TF-AL	35	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM346	REG	PERCHED WATER	GRAB		02/10/2003	INTEC	LYSIMETER	CS-AL	40.9	1	1	1	1	1	1	1	1	1		1	1	1	1	1					
PWM347	QC	WATER	FBLK		02/10/2003	INTEC	FIELD BLANK	QC	N/A		4		4	4		4	4	4		4	4	4	4	4					
PWM348	QC	WATER	RNST		02/10/2003	INTEC	EQUIPMNT RINSTE	QC	N/A	4	4	4	4	4	4	4	4	4		4	4	4	4	4					

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Alkalinity = Total

Analysis Suites:

Contingencies: